DINLI 700 cc Service Manual

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All information contained in this publication is based on the latest product information available at the time of publication.

Illustrations and photographs in this publication are intended for reference use only and may not depict actual model component parts.

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Foreword

This manual is designed primarily for use by trained mechanics in a properly equipped shop. A basic knowledge of mechanics, the proper use of tools, and workshop procedures must be understood in order to carry out maintenance and repair satisfactorily. In order to perform the work efficiently and to avoid costly mistakes, read the text thoroughly to familiarize yourself with the procedures before starting work, and then do the work carefully in a clean area. Precision measurements can only be made if the proper instruments are used, and the use of substitute tools may adversely affect safe operation.

For the duration of the warranty period, we recommend that all repairs and scheduled maintenance be performed in accordance with this service manual. Any owner maintenance or repair procedure not performed in accordance with this manual may void the warranty.

To get the longest life out of your vehicle:

- Follow the Periodic Maintenance Chart in the Service Manual.
- Be alert for problems and non-scheduled maintenance.
- Use proper tools and genuine DINLI vehicle parts. Genuine parts provided as spare parts are listed in the Parts Catalog.
- Follow the procedures in this manual carefully. Don't take shortcuts.
- Remember to keep complete records of maintenance and repair with dates and any replaced parts.

How to Use This Manual

In preparing this manual, we divided the product into its major systems. These systems became the manual's chapters. All information for a particular system from adjustment through disassembly and inspection is located in a single chapter.

The Quick Reference Guide shows you all of the product's system and assists in location of their chapters. Each chapter in turn has its own comprehensive Table of Contents.

The Periodic Maintenance Chart is located in the Periodic Maintenance chapter. The chart gives a time schedule for required maintenance operations.

If you want spark plug information, for example, go to the Periodic Maintenance Chart first. The chart tells you how frequently to clean and gap the plug. Next, use the Quick Reference Guide to locate the Electrical System chapter. Then, use the Table of Contents on the first page of the chapter to find the Spark Plug section.

Whenever you see these WARNING and CAUTION symbols, heed their instructions! Always follow safe operating and maintenance practices.

⚠ WARNING
This warning symbol identifies special instructions or procedures, which if not correctly followed, could result in personal injury, or loss of life.

CAUTION
This caution symbol identifies special instructions or procedures, which if not strictly observed, could result in damage to or destruction of equipment.

This manual contains four more symbols (in addition to WARNING and CAUTION), which will help you distinguish different types of information.

NOTE

○ This note symbol indicates points of particular interest for more efficient and convenient operation.

● Indicates a procedural step or work to be done.

○ Indicates a procedural sub-step or how to do the work of the procedural step it follows. It also precedes the text of a NOTE.

★ Indicates a conditional step or what action to take based on the results of the test or inspection in the procedural step or sub-step it follows.

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GENERAL INFORMATION

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Before Servicing

Before starting to perform an inspection service or carry out a disassembly and reassembly operation on a quad, read the precautions given below. To facilitate actual operations, notes, illustrations, photographs, cautions, and detailed descriptions have been included in each chapter wherever necessary. This section explains the items that require particular attention during the removal and reinstallation or disassembly and reassembly of general parts.

Especially note the following:

(1) Dirt

Before removal and disassembly, clean the quad. Any dirt entering the engine will shorten the life of the quad. For the same reason, before installing a new part, clean off any dust or metal fillings.

(2) Battery Ground

Disconnect the ground (-) wire from the battery before performing any disassembly operations on the quad. This prevents the engine from accidentally turning over while work is being carried out, sparks from being generated while disconnecting the wires from electrical parts, as well as damage to the electrical parts themselves. For reinstallation, first connect the positive wire to the positive (+) terminal of the battery.

(3) Installation, Assembly

Generally, installation or assembly is the reverse of removal or disassembly. However, if installation or assembly sequence is given in this Service Manual, follow it. Note parts locations and cable, wire, and hose routing during removal or disassembly so they can be installed or assembled in the same way. It is preferable to mark and record the locations and routing whenever possible.

(4) Tightening Sequence

When installing bolts, nuts, or screws for which a tightening sequence is given in this Service Manual, make sure to follow the sequence. When installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit, thus ensuring that the part has been installed in its proper location. Then, tighten them to the specified torque in the tightening sequence and method indicated. If tightening sequence instructions are not given, tighten them evenly in a cross pattern. Conversely, to remove a pat, first loosen all the bolts, nuts, or screws that are retaining the part a 1/4-turn before removing them.

(5) Torque

When torque values are given in this Service Manual, use them. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.

(6) Force

Common sense should dictate how much force is necessary in assembly and disassembly. If a part seems especially difficult to remove or install, stop and examine what may be causing the problem.

Whenever tapping is necessary, tap lightly using a wooden or plastic-faced mallet. Use an impact driver for screws (particularly for the removing screws held by non-permanent locking agent) in order to avoid damaging the screw heads.

(7) Edges

Watch for sharp edges, as they could cause injury through careless handing, especially during major engine disassembly and assembly. Use a clean piece of thick cloth when lifting the engine or turning it over.

(8) High-Flash Point Solvent

A high-Flash point solvent is recommended to reduce fire danger. A commercial solvent commonly available in North America is standard solvent (generic name). Always follow manufacturer and container directions regarding the use of any solvent.

(9) Gasket, O-Ring

Replace a gasket or an O-ring with a new part when disassembling. Remove any foreign matter from the mating surface of the gasket or O-ring to ensure a perfectly smooth surface to prevent oil or compression leaks.

(10) Liquid Gasket, Locking Agent

Clean and prepare surfaces where liquid gasket or non-permanent locking agent will be used. Apply them sparingly. Excessive amount may block engine oil passages and cause serious damage.

(11) Press

When using a press or driver to install a part such as a wheel bearing, apply a small amount of oil to the area where the two parts come in contact to ensure a smooth fit.

(12) Ball Bearing and Needle Bearing

Do not remove a ball bearing or a needle bearing unless it is absolutely necessary. Replace any ball or needle bearings that were removed with new ones. Install bearings with the manufacturer and size marks facing out, applying pressure evenly with a suitable driver. Apply force only to the end of the race that contacts the press fit portion, and press it evenly over the base component.

(13) Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals. Oil or grease seals should be pressed into place using a suitable driver, applying a force uniformly to the end of seal until the face of the seal is even with the end of the hole, unless instructed otherwise. When pressing in an oil or grease seal, which has manufacturer's marks, press it in with the marks facing out.

(14) Cir-clip, Retaining Ring, and Cotter Pin

When installing cir-clips and retaining rings, take care to compress or expand them only enough to install them and no more. Install the cir-clip with its chamfered side facing load side as well. Replace any cir-clips, retaining rings, and cotter pins with new ones, as removal weakens and deforms them,

they could become detached while the quad is driven, leading to a major problem.

(15) Lubrication

Engine wear is generally at its maximum while the engine is warming up and before all the sliding surfaces have an adequate lubrication film. During assembly, make sure to apply oil to any sliding surface or bearing that has been cleaned. Old grease or dirty oil could have lost its lubrication quality and may contain forging particles that act as abrasives; therefore, make sure to wipe it off and apply fresh grease or oil. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended.

(16) Direction of Engine Rotation

To rotate the crankshaft manually, make sure to do so in the direction of positive rotation Positive rotation is counterclockwise as viewed from the left side of the engine. To carry out proper adjustment, it is furthermore necessary to rotate the engine in the direction of positive rotation as well.

(17) Replacement Parts

When there is a replacement instruction, replace these parts with new ones every time they are removed. Always replace these parts with new ones every time they are removed. Although the previously mentioned gasket, O-ring, ball bearing, needle bearing, grease seal, oil seal, cir-clip, and cotter pin have not been so designated in their respective text, they are replacement parts.

(18) Electrical Wires

All the electrical wires are either one-color or two-color. A two-color wire is identified first by the primary color and then the stripe color. For example, a yellow wire with thin red stripes is referred to as a “yellow/red” wire; it would be a “red/yellow” wire if the colors were reversed. Unless instructed otherwise, electrical wires must be connected to wires of the same color.

(19) Inspection

When parts have been disassembled, visually inspect these parts for the following conditions or other damage. If there is any doubt as to the condition of them, replace them with new ones.

Abrasion	Crack	Hardening	Warp
Bent	Dent	Scratch	Wear
Color change	Deterioration		Seizure

(20) Specifications

Specification terms are defined as follows:

“Standards” show dimensions or performances which brand-new parts or systems have.

“Service Limits” indicate the usable limits. If the measurement shows excessive wear or deteriorated performance, replace the damaged parts.

General Precautions

⚠WARNING
○ Proper service and repair procedures are important for the safety of the service mechanic and the safety and reliability of the vehicle. ○ When 2 or more persons work together, pay attention to the safety of each other. ○ When it is necessary to run the engine indoors, make sure that exhaust gas is forced outdoors. ○ When working with toxic or flammable materials, make sure that the area you work in is well-ventilated and that you follow all of the material manufacturer's instructions. ○ Never use gasoline as a cleaning solvent. ○ To avoid getting burned, do not touch the engine, engine oil, radiator and exhaust system until they have cooled. ○ After servicing the fuel, oil, water, exhaust or brake systems, check all lines and fittings related to the system for leaks.

CAUTION
○ If parts replacement is necessary, replace the parts with genuine parts or their equivalents. ○ When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order and orientation. ○ Be sure to use special tools when instructed. ○ Make sure that all parts used in reassembly are clean. Lubricate them when specified. ○ Use the specified lubricant, bond, or sealant. ○ When removing the battery, disconnect the negative cable first and then the positive cable. ○ When reconnecting the battery, connect the positive cable first and then the negative cable, and replace the terminal cover on the positive terminal. ○ When performing service to electrical parts, if the service procedures do not require use of battery power, disconnect the negative cable from the battery. ○ When tightening the cylinder head or case bolts and nuts, tighten the larger sizes first. Always tighten the bolts and nuts to the specified torque. ○ Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, self-locking nuts, cotter pins, circlips and certain other parts as specified, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any left over material from the mating surfaces. ○ Never reuse a snap ring. When installing a new snap ring, take care not to expand the end gap larger than required to slip the snap ring over the shaft. After installing a snap ring, always ensure that it is completely seated in its groove and securely fitted. ○ Use a torque wrench to tighten fasteners to the specified torque. Wipe off grease and oil if a thread is smeared with them. ○ After reassembling, check parts for tightness and proper operation.

CAUTION
○ To protect the environment, do not unlawfully dispose of used motor oil, engine coolant and other fluids: batteries, and tires. ○ To protect Earth's natural resources, properly dispose of used vehicle and parts.

DINLI DL-702

Right Side

Left Side

● Difference between photograph and actual vehicle may exist depending on the markets.

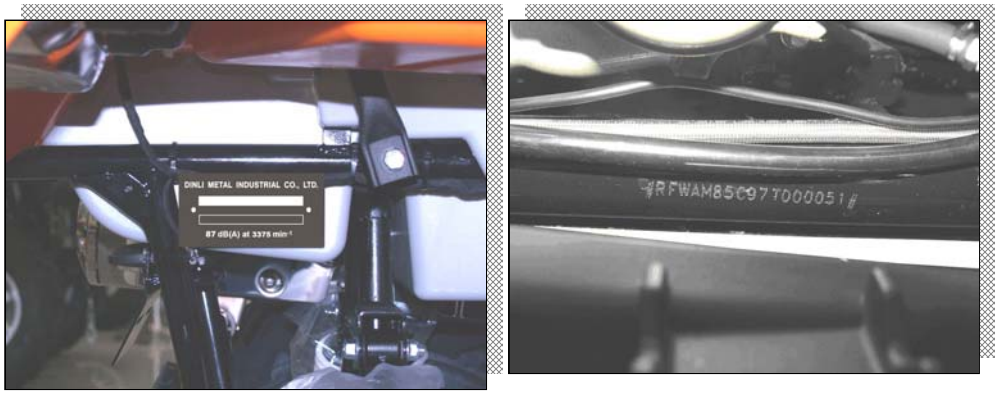
Model Identification

Engine serial number

Vehicle identification number

ENGINE SERIAL NUMBER (Ex. 15M18XXXXX)

VEHICLE IDENTIFICATION (ex. RFWAK85CX6Txxxxxx)



Whenever corresponding with DINLI about a particular issue, the engine number and serial number are important for vehicle identification.

Fuel, Oil and Engine Coolant Recommendation

Fuel (For USA and Canada)

- Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 95 octane or higher rated by the Research Method.
- Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5 % methanol with appropriate cosolvents and corrosion inhibitor is permissible.

Fuel (For Other Countries)

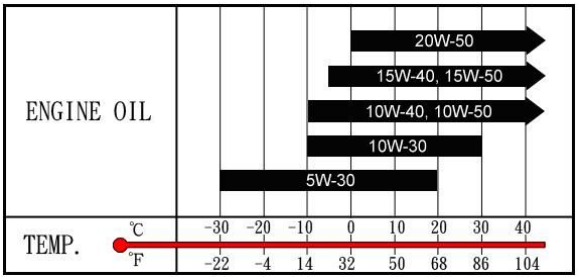
- Gasoline used should be graded 95 octane (Research Method) or higher. An unleaded gasoline is recommended.

Engine Oil (For USA)

- Dinli recommends the oil which is rated SF or SG under the API(American Petroleum Institute) service classification. The recommended viscosity is SAE 10W-40. If SAE 10W-40 oil is not available, select an alternative according to the following chart.

Engine Oil (For Other Countries)

- Use a premium quality 4-stroke motor oil to ensure longer service life of your vehicle. Use only oil which are rated SF or SG under the API service classification. The recommended viscosity is SAE 10W-40. If SAE 10W-40 motor oil is not available, select an alternative according to the right chart.



Front Differential Gear Oil

- Use hypoid gear oil that meets the API service classification GL-5 and is rated SAE #80W-90.

Rear Gear (Final) Box Oil

- Use hypoid gear oil that meets the API service classification GL-5 and is rated SAE #80W-90.

Brake Fluid

● Specification and classification: DOT 4

⚠WARNING
○ Since the brake system of this vehicle is filled with a glycol-based brake fluid by the manufacturer, do not use or mix different types of fluid such as silicone-based and petroleum-based fluid for refilling the system, otherwise serious damage will result. ○ Do not use any brake fluid taken from old or used or unsealed containers. ○ Never re-use brake fluid left over from a previous servicing, which has been stored for a long period.

Engine Coolant

● Use an anti-freeze/engine coolant compatible with an aluminum radiator, mixed with distilled water only.

Water For Mixing

● Use distilled water only. Water other than distilled water can corrode and clog the aluminum radiator.

Anti-Freeze/Engine Coolant

● The engine coolant performs as a corrosion and rust inhibitor as well as anti-freeze. Therefore, the engine coolant should be used at all times even though the atmospheric temperature in your area does not go down to freezing point.

● Dinli recommends the use of engine coolant is compatible with an aluminum radiator.

Liquid Amount of Water/Engine Coolant

Solution capacity (total): Approx. 1950 ml

● For engine coolant mixture information, refer to cooling system section in page 7-2.

CAUTION
Mixing of anti-freeze/engine coolant should be limited to 70%. Mixing beyond it would reduce its efficiency. If the anti-freeze/engine coolant mixing ratio is below 50%, rust inhabiting performance is greatly reduced. Be sure to mix it above 50% even though the atmospheric temperature does not go down to the freezing point.

Break-In Procedures

● During manufacture only the best possible materials are used and all machined parts are finished to a very high standard but it is still necessary to allow the moving parts to “Break-In” before subjecting the engine to maximum stresses. The future performance and reliability of the engine depends on the care and restraint exercised during its early life. The general rules are as follows.

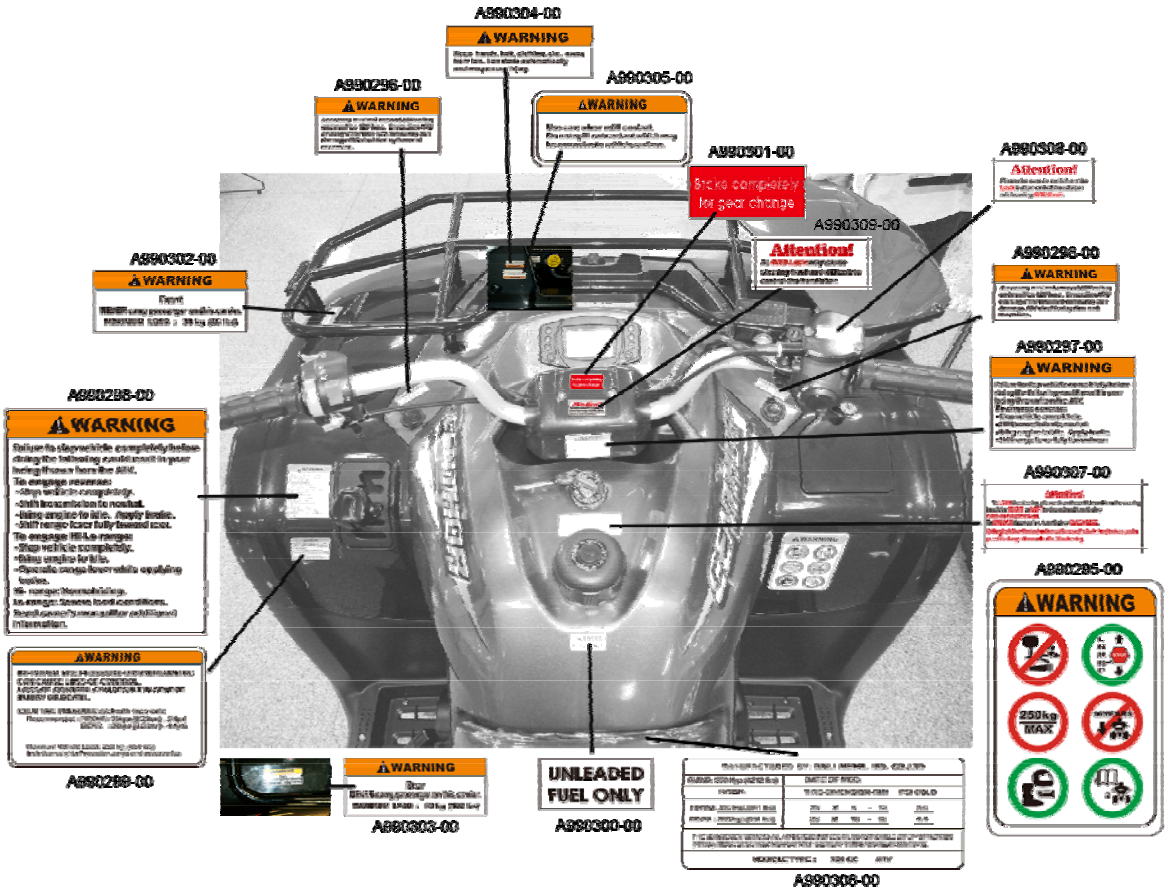
○ Keep to these break-in engine speed limits:

Break-in engine speeds

Initial 500 km: Less than 1/2 throttle

○ Upon reaching as odometer reading of 500 km you can subject the vehicle to full throttle operation, for short periods of time.

Information Labels



Do not consume alcohol, drugs or cigarettes before or during operating the ATV

Always stop the vehicle completely before changing from forward to reverse or vice versa.
Failure to do so can be hazardous.

Maximum Vehicle Load: 250kg, (551 lbs)
Includes weight of operator, cargo and accessories.
Never load over 250kg or may cause loss of control.

Never operate this ATV if you are under age 16.
Operating this ATV if you are under the age of 16 increases your chance or severe injury or death.

Always wear protective clothing when driving your ATV.

Read the Owner's Manual before riding the vehicle.

General Specification

NOTE:

Specifications subject to change without notice.

ENGINE

Model	DL-702
Engine	4 –stroke, DOHC
Number of cylinders	1
Bore and stroke	102 mm × 85 mm
Compression ratio	10.0：1
Displacement	694.6 cc
Air cleaner	Foam
Coolant system	Liquid cooled
Cooling device operating temperature	85℃
Coolant	1:2 water/anti-freeze [ethylene glycol (containing corrosion inhibitors for aluminum engines and radiators)].
Starter system	Electrical and recoil starter
Carburetor	Mikuni BSR42
Idle speed	1300 ± 100 rpm
Lubrication system	Force pressure and wet sump
Lubricant	4 –cycle motorcycle engine oil SAE 10W-40, grade API SF or higher
Gasoline	Unleaded, Octane 95 or higher

Note: Permissible operating temperature: -10℃ - 45℃

CHASSIS

Frame		Steel
Overall length		2200 mm
Overall width		1230 mm
Overall height		1230 mm
Seat height		916 mm
Wheel base		1305 mm
Ground clearance, unloaded		295 mm
Water crossing maximum depth		520 mm
Dry weight		Approx. 298 kg
Loading limit (Incl. rider, cargo, etc…)		250 kg
Front track		952 mm
Rear track		982 mm
Clutch type		Automatic CVT, wet drum
Transmission		Automatic variable ratio (V-belt)
Transfer		2-speed forward with reverse
Gearshift pattern	Transmission	Automatic
	Transfer	L-H-N-R-P
Automatic transmission ratio		Variable change (2.670 – 0.787)
Secondary reduction ratio		2.158 (40/21 × 17/15)
Final reduction ratio (Front & Rear)		3.600 (36/10)
Transmission gear ratio	Low	2.294 (39/17)
	High	1.133 (30/26)
	Reverse	1.882 (32/17)
Drive system		Shaft drive
Differential drive		2WD/4WD/4WD-lock, shaft
Front suspension		Independent, double A-arm, coil spring, oil damped
Rear suspension		Independent, double A-arm, coil spring, oil damped
Front suspension travel		170 mm
Rear suspension travel		170 mm
Steering angle		30 ° (Right & Left)
Turning radius		3.25 m
Front brake		Dual hydraulic disc
Rear brake		Single hydraulic disc
Brake fluid		DOT 4
Brake disc thickness (MIN)		Front 3 mm / Rear 3.5 mm

Front tire	AT 25 × 8 – 12, tubeless
Rear tire	AT 25 × 10 – 12, tubeless
Recommended coil tire pressure (Front/Rear)	35 kPa/ 35 kPa (5.0 psi/ 5.0 psi)

ELECTRICAL

Ignition type	CDI
Ignition timing	7 ° B.T.D.C at 1300 rpm
Spark plug	NGK CR6E
Spark plug gap	0.7 – 0.8 mm
Alternator type	Three-phase AC
Alternator output	DC 14V-23A @ 3000 rpm
Battery	GS, GTX20L-BS, 12 V/20Ah
Main fuse	30 A
Fuse	5A, 7.5A, 10A, 15A, 30A
Headlight	12V 35/35W (Main); 3W (Position)
Taillight	P21 5W; RY 10W (Indicator)
Speedometer	LCD
High beam indicator light	LED
Transfer indicator light	LCD
Engine coolant temperature indicator light	LED
Differential lock indicator light	LCD

Capacities

Fuel tank		20 L
Engine oil	Oil change	3300 ml (May be slightly different after changed oil filter)
	Overhaul	3500 ml
Differential gear oil		150 ml
Rear driver gear oil		310 ml
Coolant		1.95 L

WHEELS/TIRES

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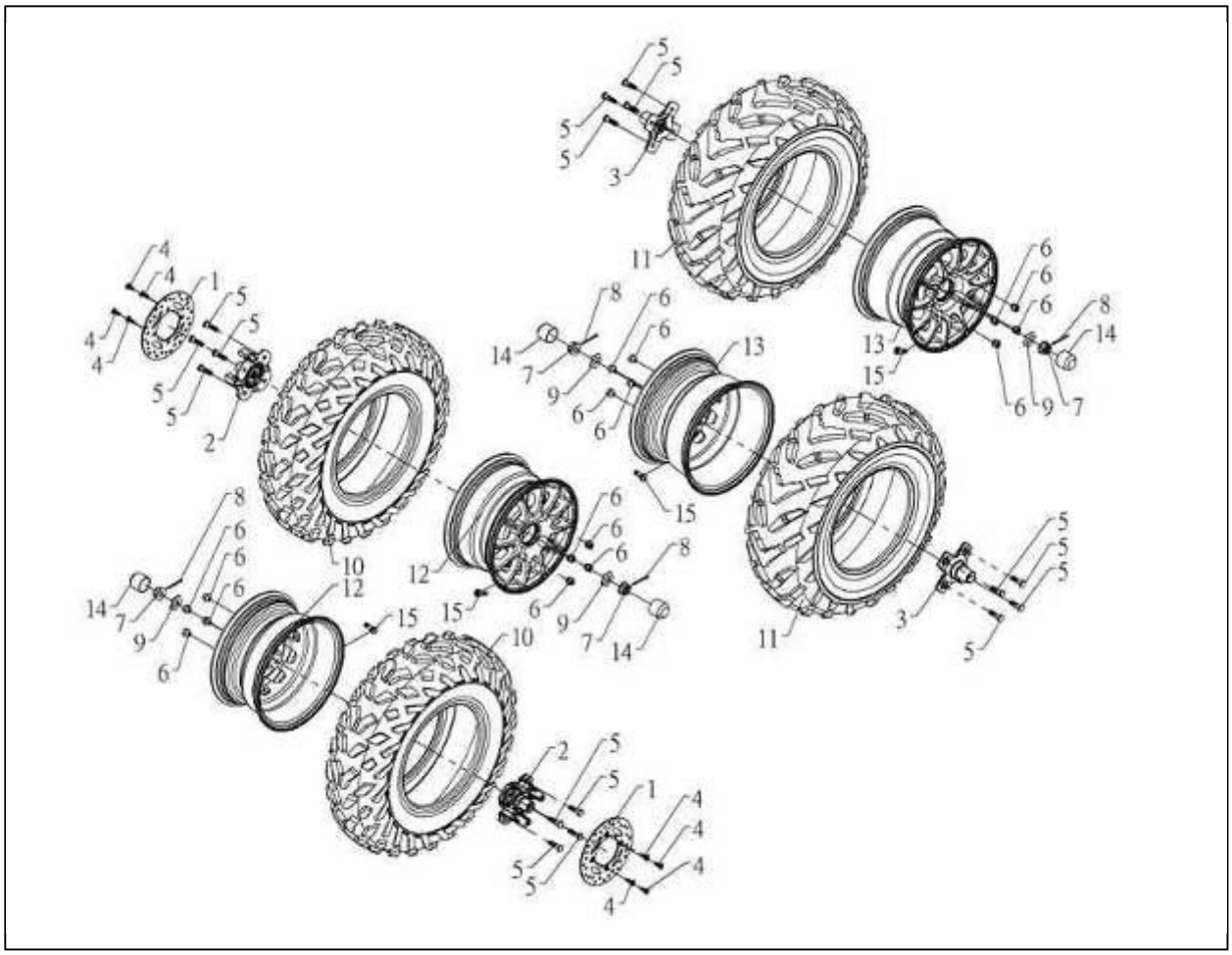
Specifications

Item		Standard
Tires:		
Standard tire:	Front	AT 25×8-12
		MAXXIS M915, Tubeless
	Rear	AT 25×10-12
		MAXXIS M916, Tubeless
Tire air pressure (when cold):		
	Front	35 kPa (0.35 kgf/cm², 5.1 psi)
	Rear	35 kPa (0.35 kgf/cm², 5.1 psi)
Maximum tire bead seat pressure:		
	Front	250 kPa (2.5 kgf/cm², 36 psi)
	Rear	250 kPa (2.5 kgf/cm², 36 psi)
Vehicle Maximum load-capacity		250 KG

Construction



1	Front Disk	6	Nut (16pcs)	11	Tire
2	Front Wheel Hub	7	Castle Nut (4pcs)	12	Rim
3	Rear Wheel Hub	8	Cotter Pin (4pcs)	13	Rim
4	FHSC (8pcs)	9	Spring Washer (4pcs)	14	Name Plate (4pcs)
5	Insert Bolt (16pcs)	10	Tire	15	Rim Valve (4pcs)

Item	N-m	kgf-m	lb-ft
4	25	2.5	18
6	60	6.0	43.5
7	110	11	80

Wheel (Rim)

Removal

- Loosen the wheel nuts [A] for just one turn.
- Support the vehicle on a stand or the jack so that the wheels are off the ground.
- Take off the wheel nuts and remove the wheel.

Installation

- Check the tire rotation mark [A] on the tire, and install the wheel accordingly.

NOTE
○ The direction of the tire rotation is shown by an arrow on the tire sidewall.

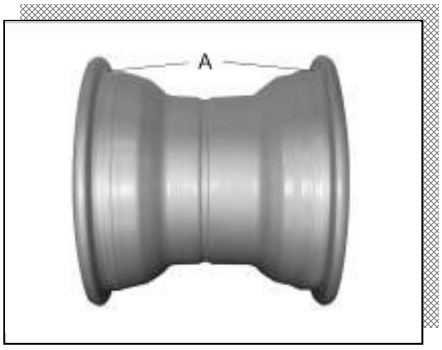
- Position the wheel so that the air valve [B] is toward the outside of the vehicle.
- Tighten the wheel nuts to the specified torque in a criss-cross pattern.

  Tightening Torque: 60 N-m (6.0 kgf-m, 43.5 lb-ft)

Inspection

● Examine both sides of the rim for dents [A]. If the rim is dented, replace it.

● If the tire is removed, inspect the air sealing surfaces [A] of the rim for scratches or nicks. Smooth the sealing surfaces with fine emery cloth if necessary



Replacement

● Remove the wheel (see Wheel Removal)

● Disassemble the tire from the rim (see Tire Removal).

○ Remove the air valve and discard it.

CAUTION
Replace the air valve whenever the tire is replaced. Do not reuse the air valve.

● Install a new air valve in the new rim.

○ Remove the valve cap, lubricate the stem with a soap and water solution, and pull the stem through the rim until it positions into place.

CAUTION
Do not use engine oil or petroleum distillates to lubricate the stem because they will deteriorate the rubber.

● Mount the tire on the new rim (see Tire Installation).

● Inflate the tire to the specified pressure.

Tire

Removal

- Remove the wheel.
- Unscrew the valve core [A] to deflate the tire.

- Dismount the bead from the rim completely as shown.

Tire Bead Breaker

⚠ WARNING
When dismounting the bead from the rim, it is necessary to deflate the tire to prevent burst.

- Separate the tire from the rim using a tire bead breaker and rim protector.

CAUTION
When using the tire bead breaker, do not scratch or hit the sealing portion (hump) of the wheel or it may cause air leakage.

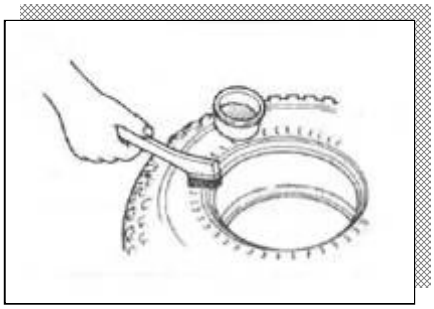
Installation

- Inspect the rim (see Wheel (Rim) Inspection).
- Replace the air valve with a new one.

CAUTION
Replace the air valve whenever the tire is replaced. Do not reuse the air valve.

- Check the tire for wear and damage (see Tire Inspection)

● Lubricate the tire beads and rim flanges with a soap and water.



⚠ WARNING
Do not use the lubricant other than a water and soap solution, or water to lubricate the tire beads and rim because it may cause tire separation.

● Check the tire rotation mark [A] on the tire, and install the tire on the rim accordingly.

○ The tires should be installed on the rims so that each air valve is toward outside of the vehicle.

NOTE
○ The direction of the tire rotation is shown by an arrow on the tire sidewall.

● Lubricate the tire beads again and center the tire on the rim.

● Mount the tire on the rim by using the tire changer.

● Inflate the tire until the tire beads seat on the rim.

⚠ WARNING
Do not inflate the tire to more than the maximum tire air pressure. Over inflation can explode the tire with possibility of injury and loss of line.

CAUTION
The standard tire fitted on this vehicle is AT25x8-12 for the front and AT25x10-12 for the rear. The use of tires other than the standard may cause instability. It is highly recommended to use the specified tire.

● Check to see that rim lines [A] on both sides of the tire are parallel with the rim flanges [B].

★If the rim lines and the rim flanges are not paralleled, deflate the tire, lubricate the sealing surfaces again, and re-inflate the tire.

● After the beads are properly seated, check for air leaks.

○ Apply a soap and water solution around the tire bead and check for bubbles.

● Deflate the tire to the specified pressure.

● Check the tire pressure using an air pressure gauge.

Tire Air Pressure (when cold)

Front: **35 kPa (5.0 psi)**

Rear: **35 kPa (5.0 psi)**

● Install the wheel (see Wheel Installation).

● Wipe off the soap and water solution on the tire and dry the tire before operation.

Tire Inspection

● Examine the tire for damage and wear.

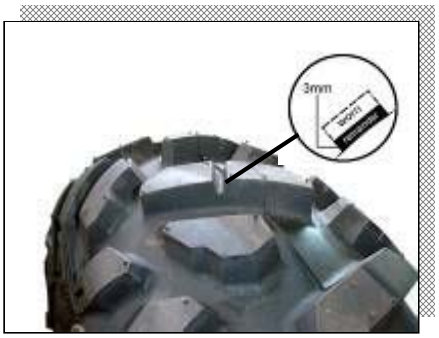
○ If the tire is cut or cracked, replace it.

○ Lumps or high spots on the tread or sidewalls indicate internal damage requiring tire replacement.

○ Remove any foreign objects from the tread. After removal, check for leaks with a soap and water solution.

○ Inspect the tire tread wear, when decrease to the specified value, replace the tire with a new one.

Tire Tread Wear	
Service Limit	3 mm



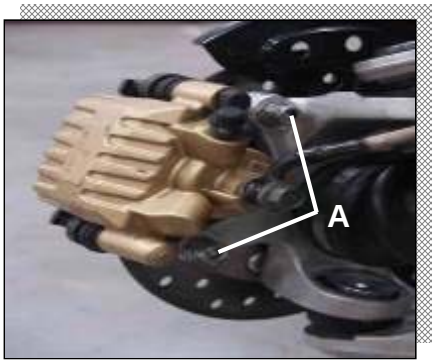
Hub

Front Hub Removal

- Remove the wheel (see Wheel Removal).
- Remove the cotter pin.

CAUTION
Replace the removed cotter pin with a new one.

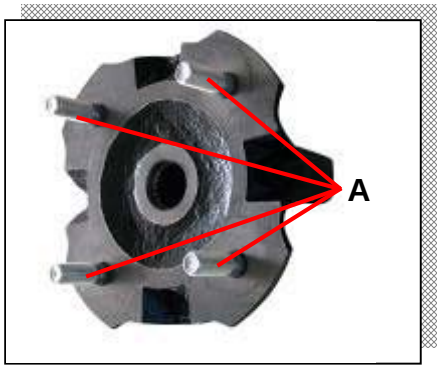
- Remove the caliper by taking off the mounting bolts [A], and let the caliper hang free.
- Remove the axle nut and pull off the front hub with brake disc.



- Separate the brake disc by removing the brake disc mounting bolts [B].

Front Hub Inspection

- Inspect the front hub bolts [A] for wear or damage. If any damages are found, replace the damaged bolts with new ones.



Front Hub Installation

● Install the front hub in the reverse order of removal. Pay attention to the following points.

○ Tighten the brake disc mounting bolts [A] to the specified torque.

Tightening Torque: 25 N-m (2.5 kgf-m, 18.0 lb-ft)

○ Apply GREASE to the hub spline.

○ Tighten the axle nut to the specified torque.

Tightening Torque: 110 N-m (11.0 kgf-m, 79.5 lb-ft)

○ Insert the new cotter pin and bent it over the nut.

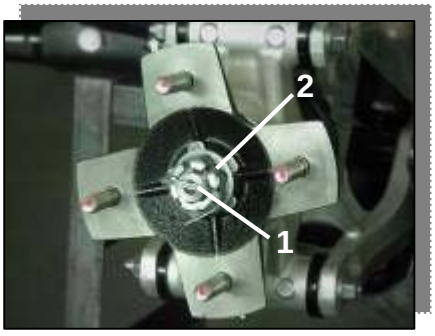
Rear Hub Removal

● Remove the wheel (See wheel Removal)

● Remove the cotter pin [1].

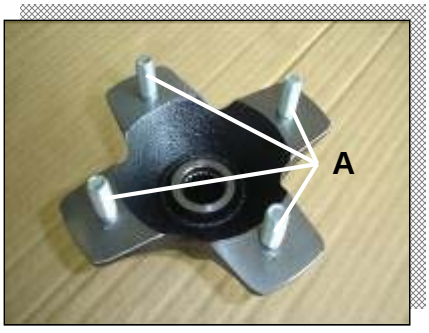
CAUTION
Replace the removed cotter pin with a new one.

● Remove the axle nut [2] with washer and pull off the rear hub.



Rear Hub Inspection

● Inspect the rear hub bolts [A] for wear or damage. If any damages are found, replace the damaged bolts with new ones.



Rear Hub Installation

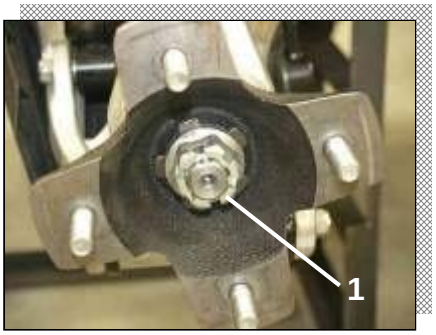
● Install the rear hub in the reverse order of removal. Pay attention to the following points.

○ Apply GREASE to the hub spline.

○ Tighten the axle nut [1] to the specified torque.

Tightening Torque: 110 N-m (11.0 kgf-m, 79.5 lb-ft)

○ Insert the new cotter pin and bent it over the nut.



BRAKE

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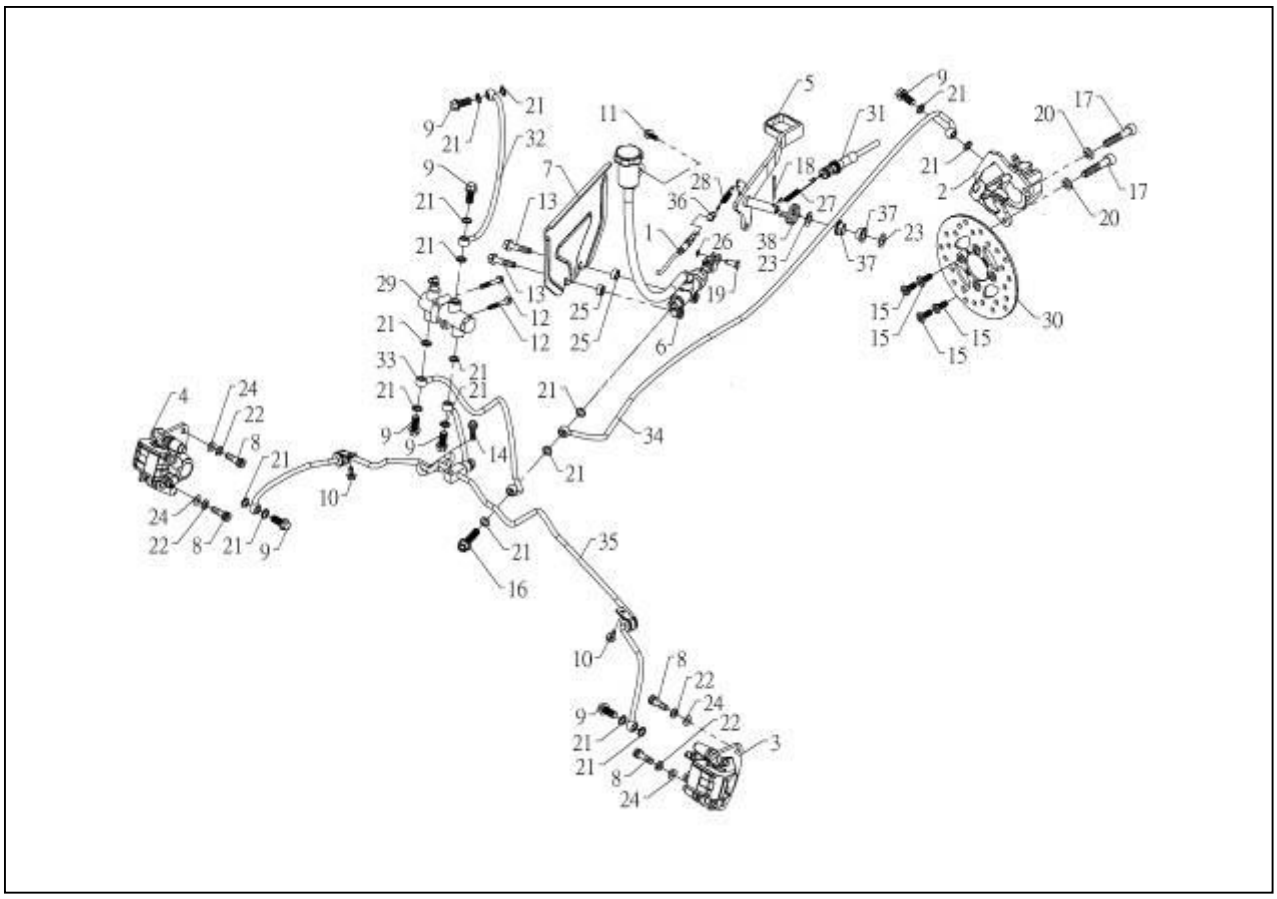
Construction



1	Reverse Switch Cable	14	Hexagonal Flange Bolt	27	Spring
2	Rear Brake Assy	15	Bolt (4pcs)	28	Spring
3	Front Brake Assy (L)	16	Hexagonal Flange Bolt	29	Pressure Valve
4	Front Brake Assy (R)	17	Hex Socket Bolt (2pcs)	30	Rear Brake Disc
5	Brake Pedal	18	Cotter Pin	31	Foot brake Sensor
6	Master Cylinder Assy	19	Pin	32	Braking Hose
7	Protector	20	Spring Washer (2pcs)	33	Braking Hose
8	Hex Socket Bolt (4pcs)	21	Washer (17pcs)	34	Braking Hose
9	Hexagonal Flange Bolt (7pcs)	22	Spring Washer (4pcs)	35	Braking Hose
10	Hexagonal Flange Bolt (2pcs)	23	Washer (2pcs)	36	Connector
11	Hexagonal Flange Bolt	24	Washer (4pcs)	37	Bush (2pcs)
12	Hexagonal Flange Bolt (2pcs)	25	Spacer (2pcs)	38	Torsion Spring
13	Hexagonal Flange Bolt (2pcs)	26	E Type Circlip		

Item	N-m	kgf-m	lb-ft
8	25	2.5	18
9	25	2.5	18
16	25	2.5	18
17	25	2.5	18

Brake Fluid

⚠ WARNING
When working with the disc brake, observe the precautions listed below.

1. *Never reuse old brake fluid.*
2. *Do not use fluid from a container that has been left unsealed or that has or that has been open for a long time.*
3. *Do not mix two different brands of fluid for use in the brake. This lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate.*
4. *Don't leave the reservoir cap off for any length of time to avoid moisture contamination of the fluid.*
5. *Don't change the fluid in the rain or when a strong wind is blowing.*
6. *Except for the disc pads and disc, use brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any parts will be difficult to wash off completely and will eventually deteriorate the rubber used in the disc brake.*
7. *When handing the disc pads or disc, be careful that no disc brake fluid or any oil gets on them. Clean off any fluid or oil that inadvertently gets on the pads or disc with a high flash-point solvent. Replace the pads with new ones if they cannot be cleaned satisfactorily.*
8. *Brake fluid quickly ruins painted surface; any spilled fluid should be completely washed away immediately.*
9. *If any of the brake line fittings or the bleed valve is opened at any time, the AIR MUST BE BLED FROM THE BRAKE LINE.*

Brake Fluid Recommendation

Use DOT 3 or 4 as a brake fluid, when pouring the brake fluid, mixed them up is not available. If there have no sign for indicates the suitable fluid, use the greater one, such as DOT 4.

Brake Fluid Level Inspection

● Position the reservoir horizontal, and check the fluid level in the reservoir.

★If the fluid level is lower than the lower level line, check for fluid leakage of the brake line, and add the fluid as follow.

○ Removal the reservoir cap, and fill the reservoir to the upper level line [A] in the reservoir with the same type and brand of the fluid that is already in the reservoir.

And then install the reservoir cap.

⚠ WARNING
Change the fluid in the brake line completely if the fluid must be refilled but the type and brand of the fluid that is already in the reservoir are unidentified.

● Tighten the reservoir cap screws to the specified torque:

Tightening Torque: 1.5 N-m (0.15 kg-m, 13 in-lb)

Brake Fluid Change

● Remove the reservoir cap and the rubber cap on the bleed valve.

● Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.

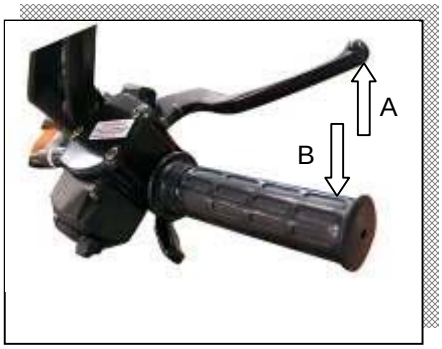
● Fill the reservoir with new brake fluid.

● Change the brake fluid as follows:

○ Open the bleed valve in counterclockwise.

○ Squeeze the brake lever [B].

○ Release the brake lever [A].



● Check the fluid level in the reservoir often, replenishing it as necessary.

NOTE
○ If the fluid in the reservoir runs completely out any time during fluid change, air will enter the line, and the system must be bled.

● Repeat this operation until fresh brake fluid comes out into the plastic hose or the color of the fluid change.

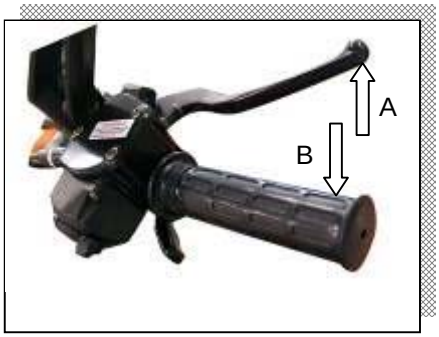
● Close the bleed valve in clockwise direction.

⚠ WARNING
Do not mix two brand of fluid. Change the brake fluid in the brake line completely if the fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are unidentified.

- Tighten the bleed valve to the specified torque:
  Tightening Torque: 5.5 N-m (0.55 kg-m, 4.0 lb-ft)
- Apply the brake lever forcefully for a few second, and check for fluid leakage around the fittings.

⚠ WARNING
If the brake lever has a soft or "spongy feeling" when it is applied, there might be air in the brake line or the brake may be defective. Since it is dangerous to operate the vehicle under such condition, bleed the air from the brake line immediately.

Brake Line Air Bleeding



- Bleed the air whenever brake parts are replaced or reassembled.
- Remove the reservoir cap and fill the reservoir with new brake fluid.
- Slowly pump the brake lever several times until no air bubbles can be seen rising up through the fluid from the hose at the bottom of the reservoir. This bleeds the air from the master cylinder and the brake line.

NOTE
○Tap the brake hose lightly going from the caliper to the reservoir side and bleed the air off at the reservoir.

- Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
- Bleed the brake line and the caliper as follows:

○ Hold the brake lever applied [B].

○ Quickly open and close the bleed valve.

○ Release the brake lever [A].

- Repeat this operation until no bubbles comes out the brake fluid reservoir.
- The fluid level must be checked several times during the bleeding operation and replenished as necessary.

NOTE
○ If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line. ○ If the brake level action still feels soft or "spongy", tap the brake hose from bottom to top and air will rise up to part of the hose. Slowly pump the brake level in the same manner as above.

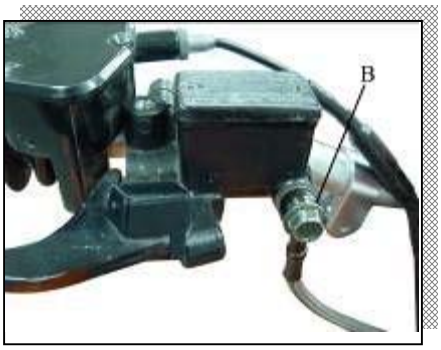
- Tighten the bleed valve to the specified torque.
  Tightening Torque: 5.5 N-m (0.55 kg-m, 4.0 lb-ft)
- Apply the brake lever forcefully for a few seconds, and check for fluid leakage around the fittings.

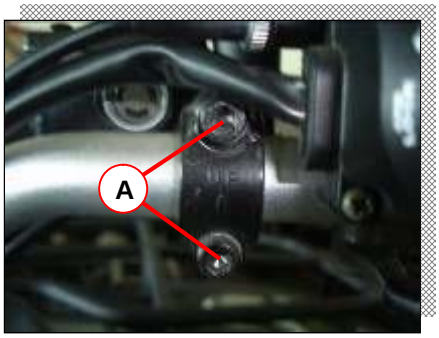
Master Cylinder

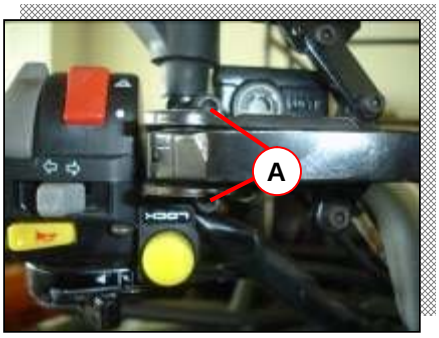
Removal

- Place a rag underneath the brake hose union bolt on the master cylinder to catch any split fluid. Remove the brake hose union bolt and disconnect the brake hose [B].
- Remove the master cylinder by taking off its clamp bolts [A].

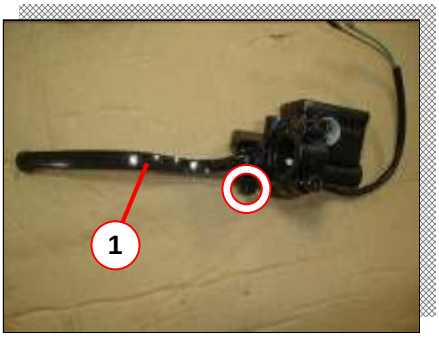
CAUTION
Brake fluid quickly ruins painted surface; any spilled fluid should be completely washed away immediately.





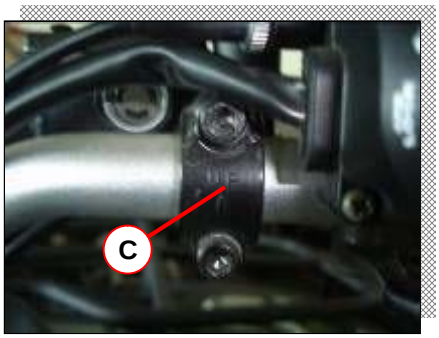


- Remove the brake lever [1].



Installation

- Install the master cylinder in the reverse order of removal. Pay attention to the following points.
- The master cylinder clamp must be installed with the "UP" mark [C] upwards.

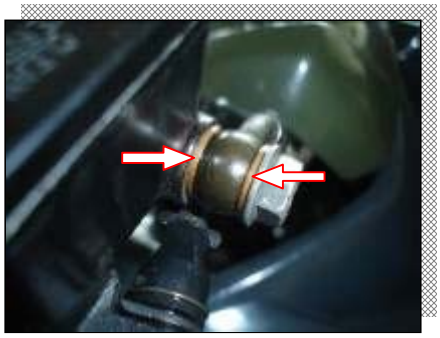


- Tighten the upper clamp bolt first, and then the lower clamp bolt. There will be a gap at the lower part of the clamp after tightening.

  Tightening Torque: 9 N-m (0.90 kg-m, 6.5 lb-ft)

- Use a new flat washer on each side of the brake hose fitting, and tighten the banjo bolt.

  Tightening Torque: 25N-m (2.5kg-m, 18.0 lb-ft)



- Bleed the brake line after master cylinder installation (see Brake Line Air Bleeding).
- Check the brake for good braking power and no fluid leakage.

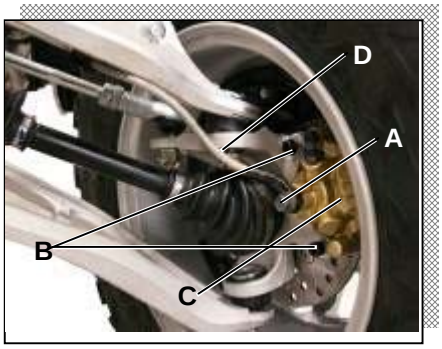
⚠ WARNING
Do not attempt to drive the vehicle until a full brake lever is obtained by pumping the brake lever until the pads are against each disc. The brakes will not function on the first application of the lever if this is not done.

Caliper

Front Caliper Removal

- Remove the front wheel (see Wheels/Tires chapter).
- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [B], and detach the caliper [C] from the disc.
- Unscrew the banjo bolt and remove the brake hose [D] from the caliper.

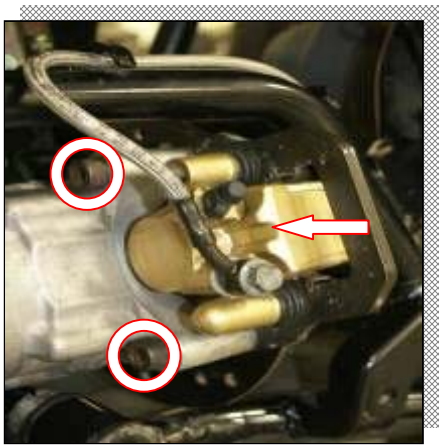
CAUTION
Immediately wash away any brake fluid that spills.



Rear Caliper Removal

- Remove the rear wheel (see Wheels/Tires chapter).
- Loosen the banjo bolt at the brake hose lower end, and tighten it loosely.
- Remove the caliper mounting bolts, and detach the caliper from the disc.
- Remove the banjo bolt and remove the brake hose from the caliper.

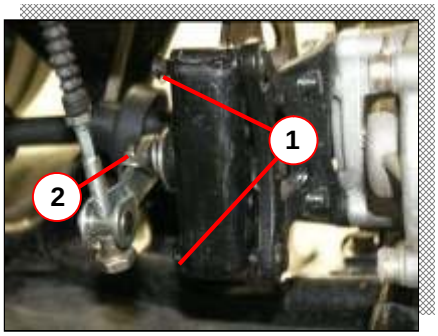
CAUTION
Immediately wash away any brake fluid that spills.



Parking Brake Caliper Removal

- Remove the rear wheel (See Wheels/Tires chapter)
- Remove the rear caliper.
- Remove the brake disc mounting bolts.

- Remove the circlip [1] and pull out the disc and the caliper, then detach the caliper from the disc.
- Remove the wire rope bolt [2] and detach the wire rope from the caliper.

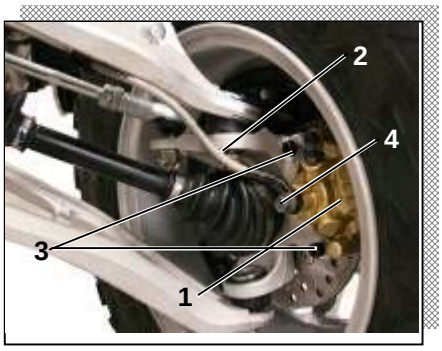


Caliper Installation

Front Brake

- Install the caliper [1] and brake hose [2].
- ○ Replace the washers that are on each side of hose fitting with new ones.
- Tighten the caliper mounting bolts [3] and the brake hose banjo bolt [4] to the specified torque:

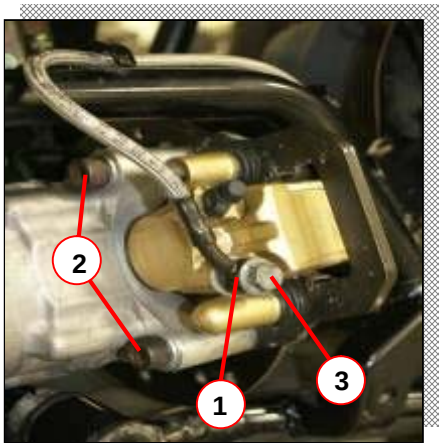
  Caliper Mounting Bolts: 25N-m (2.5kg-m, 18.0ft-lb)
  Brake Hose Banjo Bolt: 25N-m (2.5kg-m, 18.0ft-lb)



Rear brake

- Install the caliper in the reverse order of removal. Pay attention to the following points.
- ○ Replace the washers [1] that are on each side of hose fitting with new ones.
- ○ Tighten the caliper mounting bolts [2] and the brake hose banjo bolt [3] to the specified torque:

  Caliper Mounting Bolts: 25N-m (2.5kg-m, 18.0ft-lb)
  Brake Hose Banjo Bolt: 25N-m (2.5kg-m, 18.0ft-lb)



- Check the fluid level in the brake reservoir.
- Bleed the brake line (see Brake Line Air Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

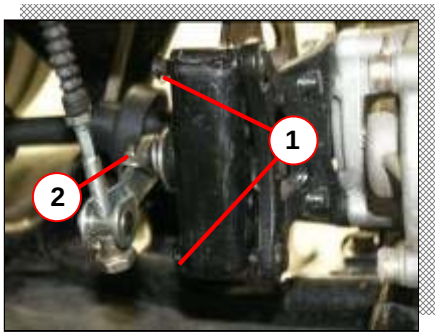
⚠ WARNING
Do not attempt to drive the vehicle until a full brake lever is obtained by pumping the brake lever until the pads are against each disc. The brakes will not function on the first application of the lever if this is not done.

Parking Brake

- Install the parking brake caliper in the reverse order of removal. Pay attention to the following points.
- Attach the caliper and the brake disc, install the brake disc to the rear hub and tighten them to the specified torque.

  Tightening Torque: 25 N-m (2.5 kgf-m, 18.0 lb-ft)

- Replace the circlips [1] with new ones.
- Tighten the wire rope bolt [2].



Caliper Inspection

- Inspect the brake caliper for any scratches or other damage, if any damages are found, replace the caliper with a new one.

- If any rubber parts have been removed from the caliper, replace them with new ones.

Brake Pad

Removal

● Remove the wheels (see Wheels/Tires chapter).

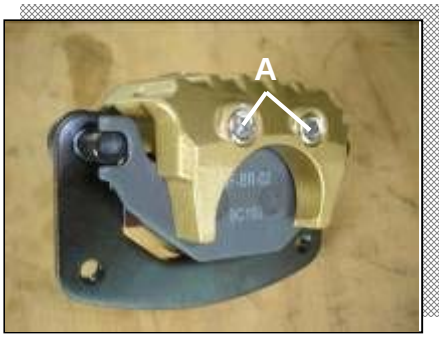
Front Brake

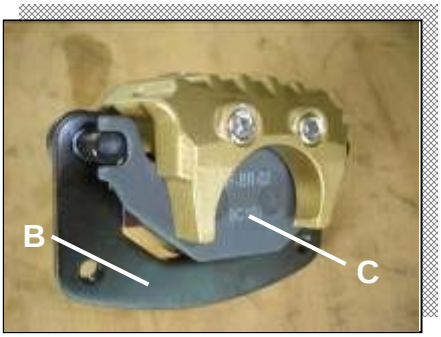
● Remove the front caliper (see Caliper Removal).

● Remove the brake pad mounting bolts [A].

● Push the plate [B], remove the pads [C].

● Remove the anti-rattle spring.



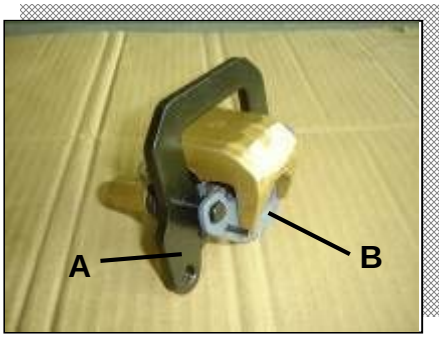


Rear Brake

● Remove the rear caliper (See Caliper Removal).

● Push the plate [A], remove the pads [B].

● Remove the anti-rattle spring.

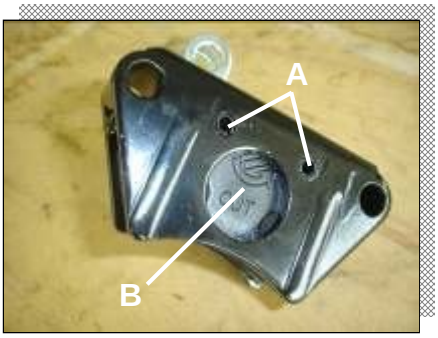


Parking Brake

● Remove the rear caliper (See Caliper Removal).

● Remove the parking brake caliper (See Caliper Removal).

● Remove the pins [A] that attach the caliper and the brake pads, then remove the pads [B].



Installation

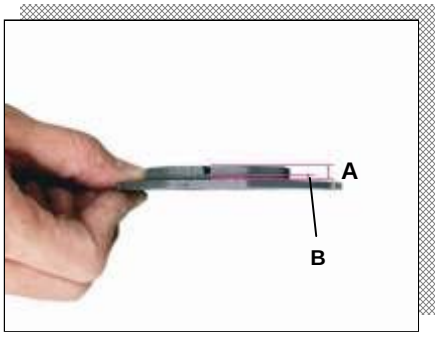
- Push the caliper piston in by hand as far as it will go.
- Be sure that the anti-rattle spring is in place.
- Install the brake pads, pad [B] is for front brake, pad [C] is for rear brake.
- Apply THREAD LOCK to the brake pad mounting bolts.
- Tighten the front brake pad mounting bolts to the specified torque:

  Tightening Torque: 18N-m (1.8kg-m, 13.0ft-lb)

WARNING
Do not attempt to drive the vehicle until a full brake lever is obtained by pumping the brake lever until the pads are against each disc. The brakes will not function on the first application of the lever if this is not done.

NOTE
After replacing the brake pads, pump the brake lever a few times to check for proper brake operation and then check the brake fluid level.

Inspection



- Check the lining thickness [A] of the pads in each caliper.

★ If the lining thickness of either pad is less than the service limit [B], replace both pads in the caliper as a set.

Pad Lining Thickness	
Standard	4.5 mm
Service Limit	2 mm

Brake Disc

Disc Cleaning

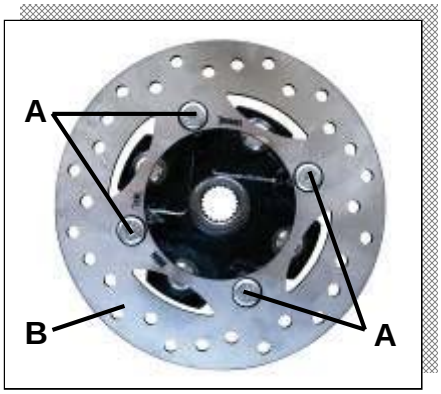
- Poor braking can be caused by oil on a disc. Oil on a disc must be cleaned off with an oil cleaning fluid such as trichloroethylene or acetone.

⚠ WARNING
These cleaning fluids are usually highly flammable and harmful if breathed for prolonged periods. Be sure to heed the fluid manufacturer's warnings.

Front Brake Disc Removal

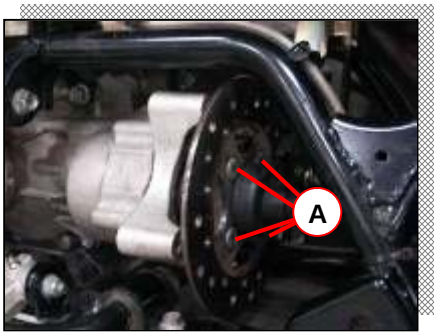
- Remove the front wheel (see Wheel Removal).
- Remove the front brake caliper.
- Remove the front hub by removing its cotter pin and axle nut.

- Remove the brake disc mounting bolts [A].
- Remove the brake disc [B].

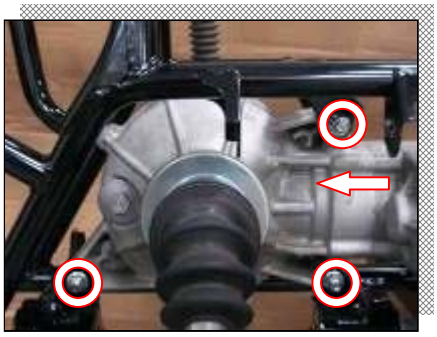


Rear Brake Disc Removal

- Remove the rear wheel (see Wheel Removal).
- Remove the rear caliper (see Rear Caliper Removal) and Parking Brake Caliper, unscrew the banjo bolt and remove the brake hose from the caliper.
- Loosen the brake disc mounting bolts [A].



- Remove the rear gear box bolts and slide the gear box backward.
- Remove the disc.

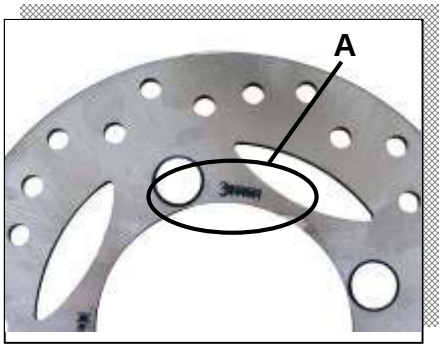


Front Disc Installation

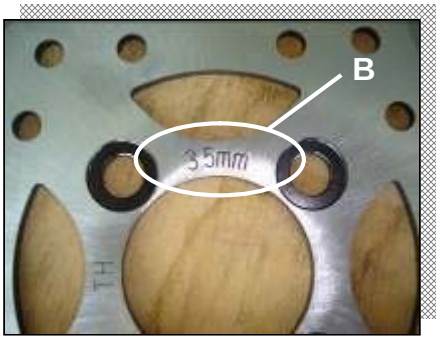
- The disc must be installed with the marked side [A] facing toward the steering knuckle.
- Apply non-permanent locking agent: Disc Mounting Bolts.
- Tighten the disc mounting bolts to the specified torque.

  Tightening Torque: 25 N-m (2.5 kg-m, 18.0 lb-ft)

- After installing the discs, check the disc runout. Completely clean off any grease that has gotten on either side of the disc with a high flash point solvent.



Rear Disc Installation



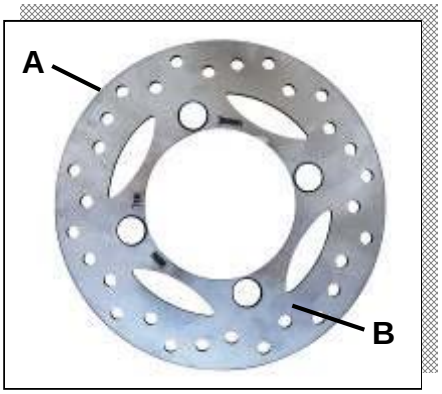
- The disc must be installed with the marked side [B] facing toward front.
- Apply non-permanent locking agent: Disc Mounting Bolts.
- Tighten the disc mounting bolts to the specified torque.

  Tightening Torque: 25 N-m (2.5 kg-m, 18.0 lb-ft)

- After installing the discs, check the disc runout (see Disc Runout). Completely clean off any grease that has gotten on either side of the disc with a high flash point solvent.

Inspection

Disc Wear



- Measure the thickness of each disc at the point [A] where it has worn the most.

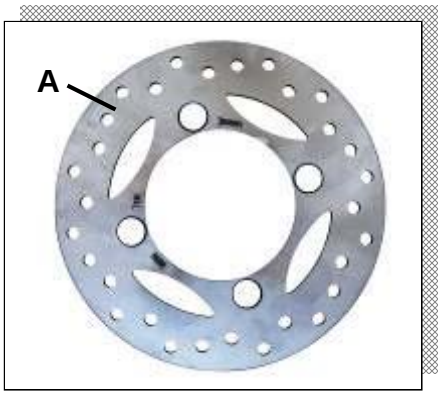
★ Replace the disc if has worn past the service limit.
[B] Measuring Area

Front Disc Thickness	
Service Limit	3 mm

Rear Disc Thickness	
Service Limit	3.5 mm

Micrometer (0 – 25 mm)

Disc Runout



- Jack up the vehicle so that the wheels are off the ground.
- Remove the front wheels and turn the handlebar fully to one side.
- Set up a dial gauge against the disc [A], and measure the disc runout.

★ If the runout exceeds the service limit, replace the disc.

Disc Runout	
Service Limit	0.3 mm

Dial gauge (1/100 mm)

Magnetic stand

Brake Hose and Pressure Valve

Inspection

Brake Hose

- The high pressure inside the brake line can cause fluid to leak or the hose to burst if the line is not properly maintained. Bend and twist the brake hose while examining it.

★Replace it if any cracks or bulges are noticed.

Pressure Valve

- Inspect the pressure valve for leakage, if any leakage has been found, replace the pressure valve with a new one.

Replacement

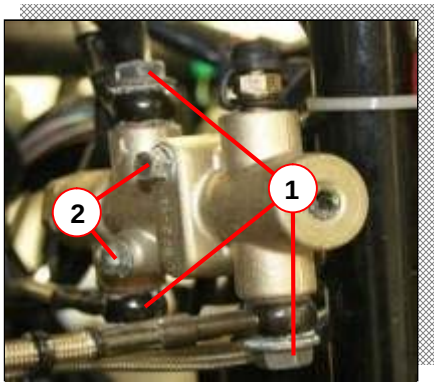
Brake Hose

- Pump the brake fluid out of the line as explained in the Brake Fluid Change.
- Remove the banjo bolts at both ends of the brake hose, and pull the hose off the vehicle.
- Immediately wipe up any brake fluid that spills.

CAUTION
Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely washed away immediately.

- Use a new flat washer for each side of the hose fittings.
- Install the new brake hose in its place, and tighten the banjo bolts to the specified torque.
  Tightening Torque: 25N-m (2.5kg-m, 18.0ft-lb)
- After installing the brake hose, bleed the brake line immediately (see Brake Line Air Bleeding).

Pressure Valve



- Remove the brake hose banjo bolts [1] and remove the pressure valve mounting bolts [2].

CAUTION
Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely washed away immediately.

- Install the pressure valve by installing the brake hose banjo bolts and pressure valve mounting bolts.
- Bleed the brake line (see Brake Line Air Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

Foot Brake

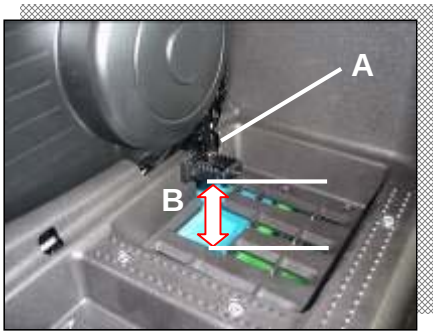
Brake Pedal Inspection

Brake Pedal Position

● Check that the brake pedal [A] is in the correct position as shown.

Pedal Position [B]	
Standard	72 ~ 80 mm above footrest

★ If it is correct, adjust the brake pedal position.



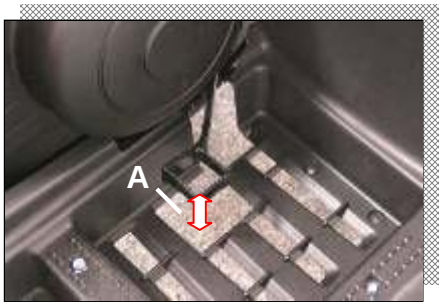
Brake Pedal Free Play

● Check the brake pedal free play [A].

○ Depress the brake pedal lightly by hand until the brake is applied.

★ If the free play is incorrect, adjust it.

Pedal Free Play	
Standard	2 .2 ± 0.5 mm

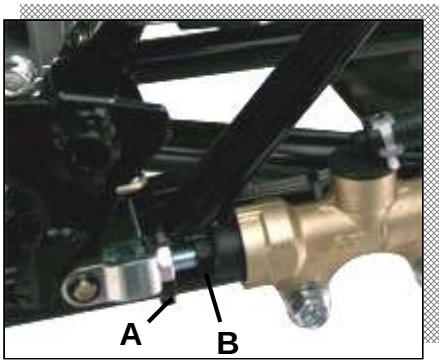


Brake Pedal Position Adjustment

● Remove the brake pedal (see Brake Pedal Removal).

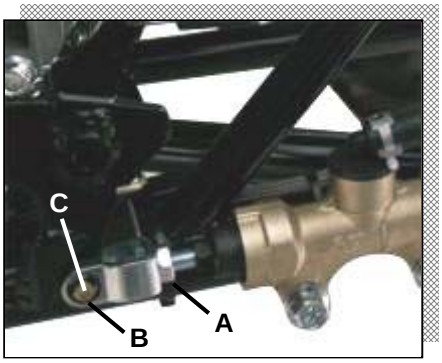
● Loosen the locknut [A], and turn the nut [B] until pedal is correctly positioned.

● Tighten the locknut [A].

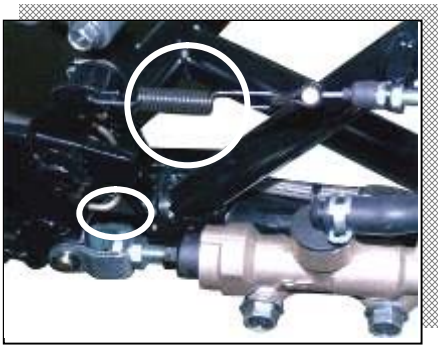


Brake Pedal Removal

- Remove the brake pedal by removing the master cylinder locknut [A], circlip [B] and pin [C].



- Pulling down the springs (where circled), remove the brake pedal.



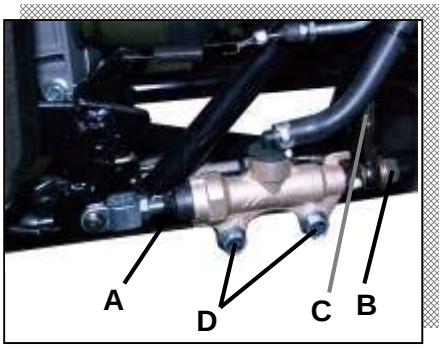
Brake Pedal Installation

- Reverse the Removal steps to install the brake pedal.

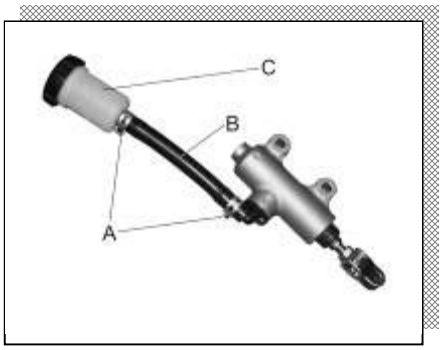
Master Cylinder Removal

- Remove the master cylinder joint [A] and the banjo bolt [B] at the brake hose lower end, and tighten it loosely.
- Remove the brake hose [C].
- Loosen the master cylinder mounting bolts [D].

CAUTION
Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely washed away immediately.



- Remove the clamps [A], hose [B] and reservoir [C].



Master Cylinder Installation

- Use a new flat washer on each side of the brake hose fitting, and tighten the banjo bolt to the specified torque.

  Tightening Torque: 25N-m (2.5kg-m, 18.0ft-lb)

- Check the fluid level [A] in the brake reservoir.
- Bleed the brake line after master cylinder installation (see Brake Line Air Bleeding).
- Check the brake for good braking power and no fluid leakage.

SUSPENSION & STEERING & DRIVE SHAFT

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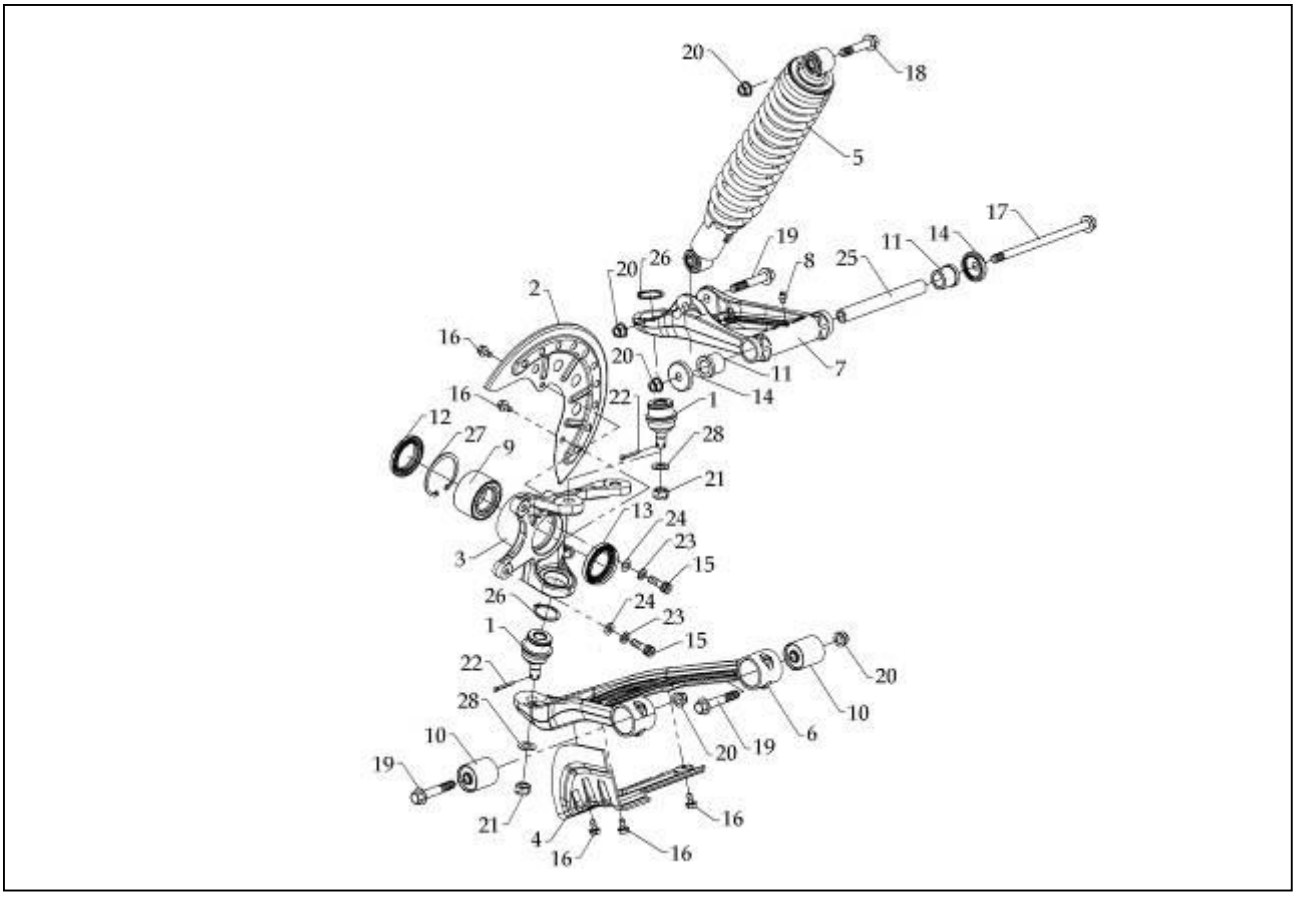
Front Suspension

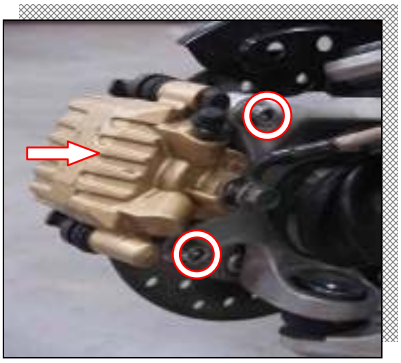
Construction



1	Ball joint (2pcs)	11	Bush (2pcs)	21	Castle nut (2pcs)
2	Brake disc cover	12	Oil seal	22	Cotter pin (2pcs)
3	Steering knuckle	13	Oil seal	23	Spring washer (2pcs)
4	Driver shaft protector	14	Cap (2pcs)	24	Spacer (2pcs)
5	Front shock absorber	15	Hex socket bolt (2pcs)	25	Spacer
6	Lower A-arm	16	Hex washer face bolt (5pcs)	26	C-type circlip
7	Upper A-arm	17	Hex washer face bolt	27	C-type circlip
8	Grease valve	18	Hex washer face bolt	28	Spacer (2pcs)
9	Double row angular bearing	19	Hex washer face bolt (3pcs)		
10	Bush (2pcs)	20	Hex insert lock nut (5pcs)		

Removal and Disassembly

- Remove the front wheels/tires. (See Wheels/Tires chapter)
- Remove the front fender and the footboard. (See Body chapter)
- Remove the front wheel hubs with brake discs.(See brake chapter)
- Remove the front brake calipers and hang it free.



- Remove the driver shaft protector.

- Remove the cotter pins and tie rod end nuts.

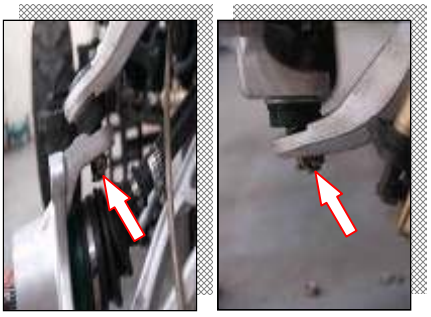
CAUTION
Remove the removed cotter pins with new ones.

- Remove the front brake disc covers.

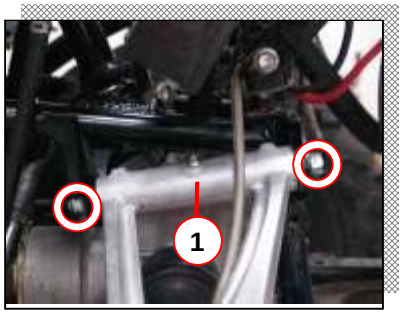
- Remove the cotter pins and knuckle end nuts.

CAUTION
Remove the removed cotter pins with new ones.

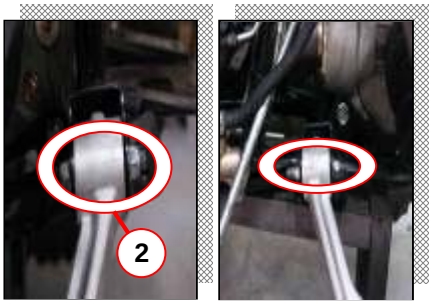
- Remove the steering knuckle.



- Remove the shock absorber lower mounting bolts/nuts and the upper A-arm washer face bolts/nuts.
- Remove the upper A-arms [1].



- Remove the lower A-arm washer face bolts/nuts.
- Remove the lower A-arms [2].



- Remove the shock absorber upper mounting bolts/nuts.
- Remove the shock absorbers.

Inspection

Front shock absorber

● Inspect the shock absorbers for oil leakage or damage. If any damages are found, replace it with a new one.

Knuckle End

● Inspect the knuckle end boots for wear or damage. If any damages are found, replace it with a new one.

● Remove the snap ring [1].

● Remove the knuckle ends with the special tools.

Bearing Installer Set

Front Fork Installer Hammer

A-arm

● Inspect the A-arm for wear or damage. If any damage are found, replace it with a new one.

Drive Shaft Protector

● Inspect the driver shaft protector for wear or damage. If any damages are found, replace it with a new one.

Brake Disc Cover

● Inspect the brake disc covers for dent or damage. If any damages are found, replace it with a new one.

Bushing

● Inspect the rubber bushings (A-arm) for wear or other damage. If any damages are found, replace them with new ones.

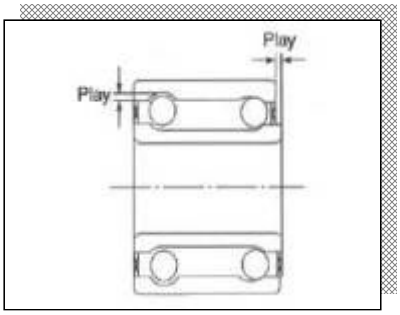
Oil Seal

● Inspect the Oil seal lips for wear or damage. If any damages are found, replace them with new ones.

● Remove the steering knuckle oil seals by using the appropriate bar.

CAUTION
Remove the removed oil seals with new ones.

Hub Bearing



- Inspect the inner race play of the hub bearings by hand while they are in the steering knuckles.
- Rotate the inner races by hand to inspect for abnormal noise and smooth rotation. If there is anything unusual, replace the bearing with a new one.

NOTE
Make sure to check each bearing in the same manner.

- Remove the circlip.

- Remove the hub bearings from the direction that the arrow marks.

Reassembly and Installation

- Reassemble and install the front suspension in the reverse order of removal and disassembly. Pay attention to the following points.

- Install the hub bearings with the special tool.

- Install the steering knuckle oil seal with the special tool.
- The oil seal which has faces to the front hub can be installed by hand.

- Install the knuckle end boots to the upper and lower A-arm with the special tool.

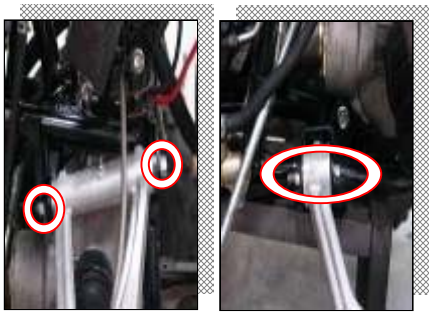
- Install the snap rings [1].

● Install the knuckles to the upper A-arms by installing the bolts.

● Apply THREAD LOCK to the A-arm washer face nut, and then tighten the nut to the specified torque.

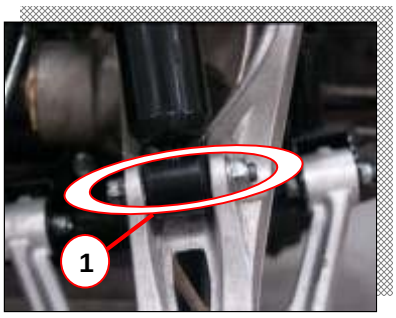
Tightening Torque: Upper 60 N-m (6.0 kgf-m, 43.5 lb-ft)

Lower 60 N-m (6.0 kgf-m, 43.5 lb-ft)



● Tighten the shock absorber mounting lower bolt/nut [1] to the specified torque.

Tightening Torque: 60 N-m (6.0 kgf-m, 43.5 lb-ft)



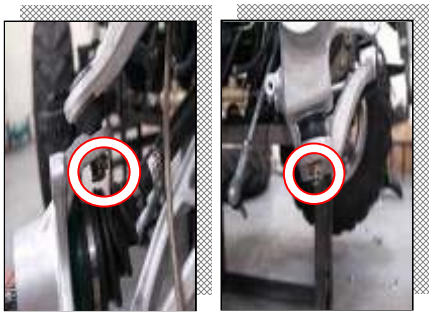
● Tighten the shock absorber mounting upper bolt/nut [2] to the specified torque.

Tightening Torque: 60 N-m (6.0 kgf-m, 43.5 lb-ft)

● Tighten the knuckle end nut (upper and lower) to the specified torque.

Tightening Torque: 29 N-m (2.9 kgf-m, 21.0 lb-ft)

● Install the new cotter pins to the nuts.



- Tighten the tie rod end nut to the specified torque.

  Tightening Torque: 29 N-m (2.9 kgf-m, 21.0 lb-ft)

- Install the new cotter pins to the nuts

- Apply THREAD LOCK to the front brake disk cover mounting bolts, and then tighten them securely.

  Tightening Torque: 10 N-m (1.0 kgf-m, 7.0 lb-ft)

- Install the front wheel hubs with brake discs.
- Install the front brake calipers
- Install the front wheels/tires.

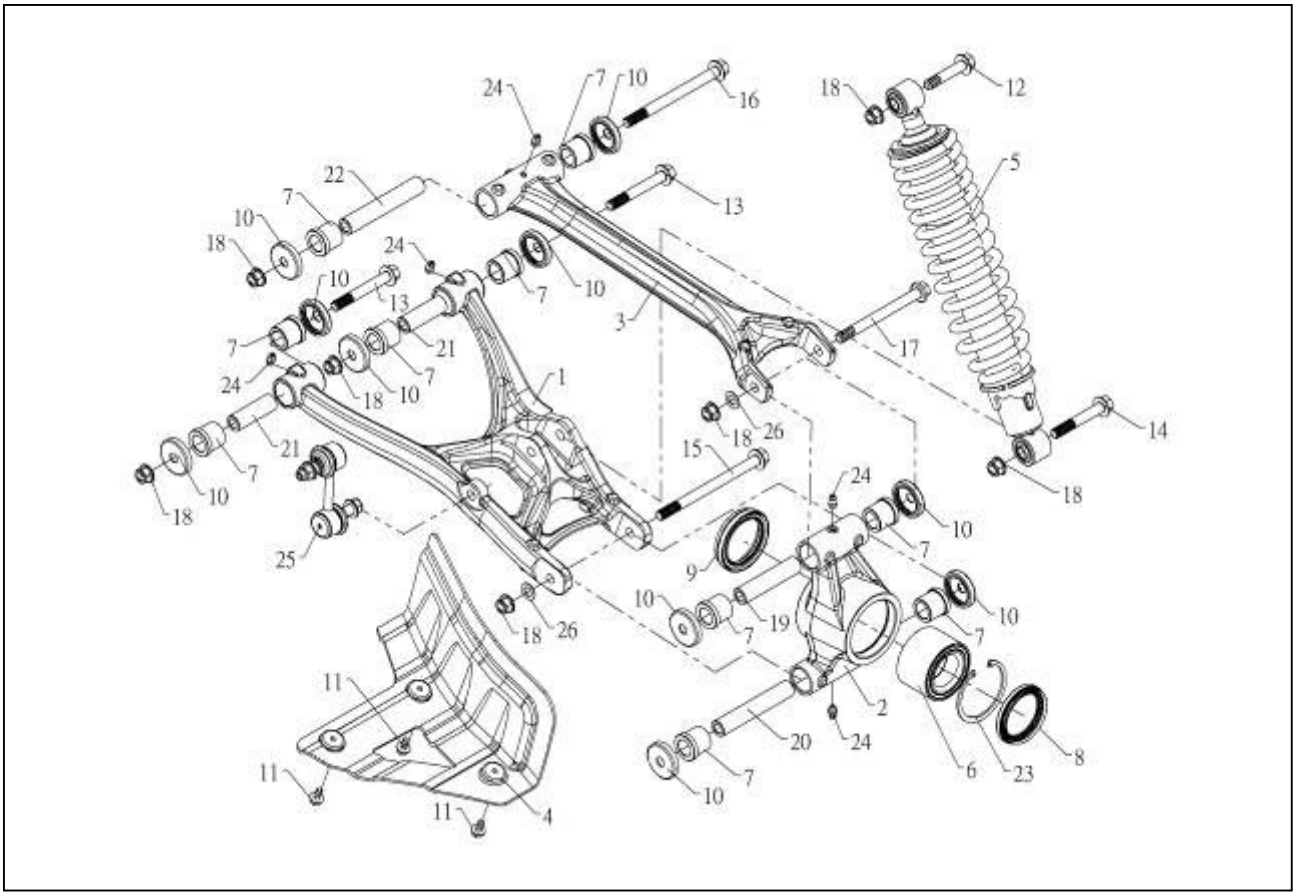
Spring Pre-Load Adjustment

- After installing the front shock absorbers, adjust the spring pre-load.
- The spring adjusting sleeve on shock absorber has 5 positions so that the spring can be adjusted for different terrain and loading conditions. If the spring action feels too soft or too stiff, adjust it in accordance with the following photograph.
- Turn the adjusting sleeve on shock absorber to the desired position with the wrench

⚠ WARNING
Be sure to adjust the spring pre-load on the both shock absorbers equally.

Rear Suspension

Construction



1	Lower arm	10	Cap (10pcs)	19	Spacer
2	Rear knuckle	11	Hex washer face bolt (3pcs)	20	Spacer
3	Upper arm	12	Hex washer face bolt	21	Spacer (2pcs)
4	Driver shaft protector	13	Hex washer face bolt (2pcs)	22	Spacer
5	Rear shock absorber	14	Hex washer face bolt	23	C-type circlip
6	Double row angular bearing	15	Hex washer face bolt	24	Grease valve
7	Bush (10pcs)	16	Hex washer face bolt	25	Stabilizer joint
8	Oil seal	17	Hex washer face bolt	26	Spacer (2pcs)
9	Oil seal	18	Insert lock nut (7pcs)		

Removal

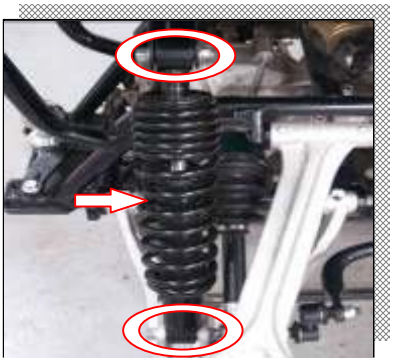
- Remove the rear wheel.
- Remove the exhaust pipe.
- Remove the driver shaft protector.

- Remove the cotter pin and rear hub nut.
- Remove the rear wheel hub.

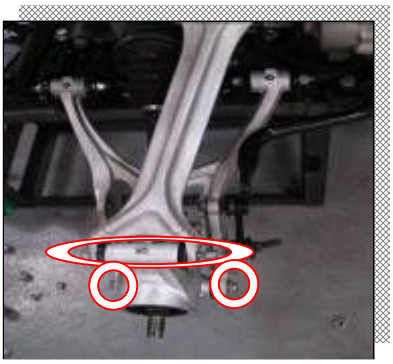
CAUTION
Replace the removed cotter pin with a new one.

- Remove the rear stabilizer joint lower bolt/nut.

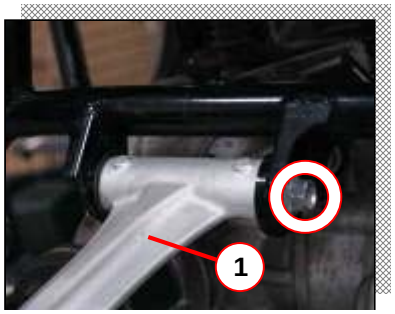
- Remove the rear shock absorber.



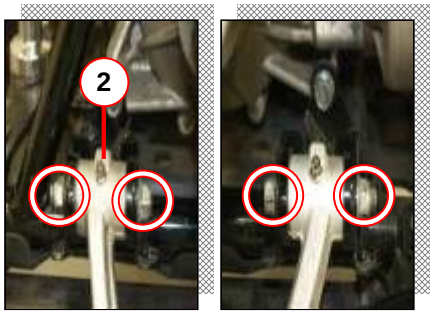
- Remove the rear knuckle mounting bolts/nuts and remove the rear knuckle.



● Remove the upper arm [1] by removing the washer face bolt/nut.



● Remove the lower arm [2] by removing the washer face bolt/nuts.



Inspection and Disassembly

Rear Shock Absorber

● Inspect the shock absorber for oil leakage or damage. If any damages are found, replace the rear shock absorber with a new one.

Bushing

● Inspect the rubber bushing (shock absorber/suspension arm) for wear or other damage. If any damages are found, replace the bushing with a new.

Oil Seal

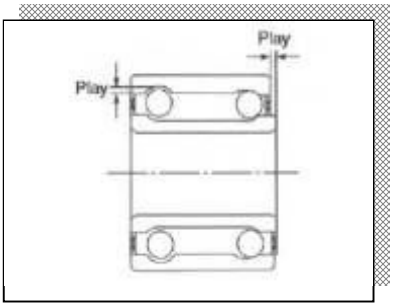
- Inspect the Oil seal for wear or damage. If any damages are found, replace the oil seal with a new one.

- Remove the rear knuckle oil seal with a suitable bar.

CAUTION
Replace the removed oil seal with a new one.

Hub Bearing

- Inspect the inner race play of the hub bearing by hand while it is in the rear knuckle.
- Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. If there is anything unusual, replace the bearing with a new one.



- Remove the hub bearing circlip [1].

● Remove the hub bearing from the direction that arrow marks.

Reassembly and Installation

● Reassemble and install the rear suspension in the reverse order of removal and disassembly. Pay attention to the following points.

● Apply GREASE to the hub bearings and the lips of the oil seals before installing them.

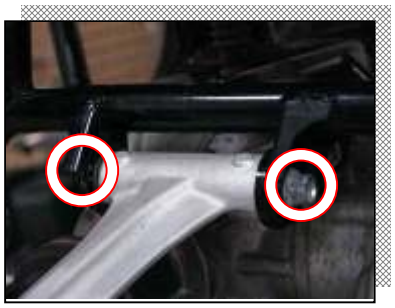
● Install the hub bearings with the special tool.

● Install the rear knuckle oil seal with the special tool.

● Tighten the suspension arm nuts to the specified torque.

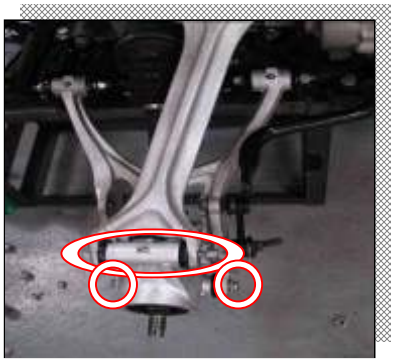
Tightening Torque: 60 N-m (6.0 kgf-m, 43.5 lb-ft)

(Upper & Lower)



● Tighten rear knuckle bolt/nut to the specified torque.

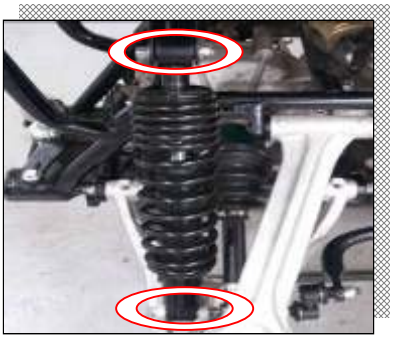
Tightening Torque: 60 N-m (6.0 kgf-m, 43.5 lb-ft)



● Apply THREAD LOCK to the rear shock absorber mounting bolts, and then tighten the nut to the specified torque.

Tightening Torque: 60 N-m (6.0 kgf-m, 43.5 lb-ft)

(Upper & Lower)



● Tighten the rear stabilizer joint bolt/nut.

Tightening Torque: 34 N-m (3.4 kgf-m, 24.5 lb-ft)

Spring Pre-Load Adjustment

- After installing the rear shock absorbers, adjust the spring pre-load.
- The spring adjusting sleeve on shock absorber has 5 positions so that the spring can be adjusted for different terrain and loading conditions. If the spring action feels too soft or too stiff, adjust it in accordance with the following photograph.
- Turn the adjusting sleeve on shock absorber to the desired position with the wrench

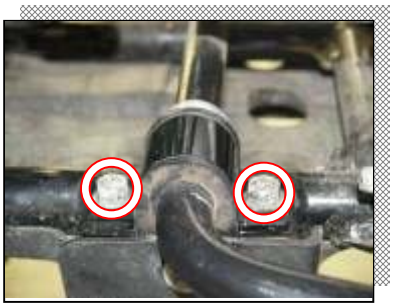
.

⚠ WARNING
Be sure to adjust the spring pre-load on the both shock absorbers equally.

Rear Stabilizer Removal

- Remove the rear wheel.
- Remove the rear stabilizer joint bolt/nut.

- Remove the rear stabilizer bracket bolts.
- Remove the rear stabilizer bar.



Inspection

Rear Stabilizer Bar

- Inspect the stabilizer for damage. If any damages are found, replace the rear stabilizer bar with a new one.

Stabilizer Bracket/Bushing

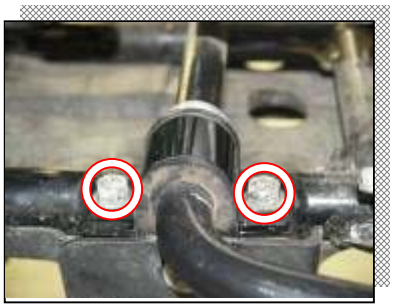
- Inspect the stabilizer bracket for damage. If any damage are found, replace the stabilizer bracket with a new one.
- Inspect the plastic bushing for wear or other damage. If any damages are found, replace the bushing with a new one.

Stabilizer Link

- Inspect the stabilizer joint for wear or damage. If any damages are found, replace the stabilizer joint with a new one.

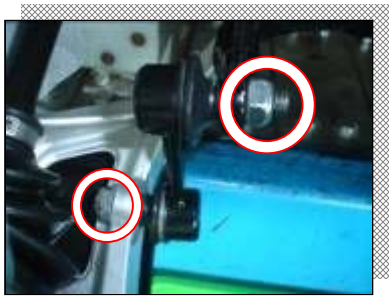
Rear Stabilizer Installation

- Install the stabilizer bar.
- Tighten the rear stabilizer bracket bolts.



- Tighten the rear stabilizer joint bolt/nut.

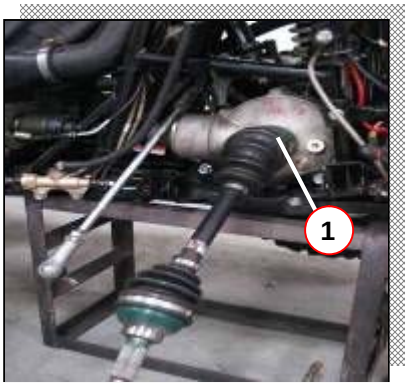
  Tightening Torque: 34 N-m (3.4 kgf-m, 24.5 lb-ft)



Front Propeller Shaft

Removal and Disassembly

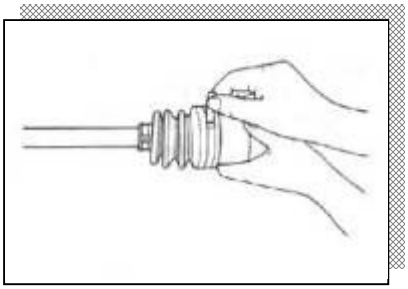
- Remove the front tire/wheel.
- Remove the front hub by removing its cotter pin and nut.
- Remove the front suspension (see Front Suspension).
- Hold the inboard joint [1] of the front propeller shaft and tug the propeller shaft horizontally.



NOTE
If it is difficult to remove the front drive shaft by hand, use the special tools.

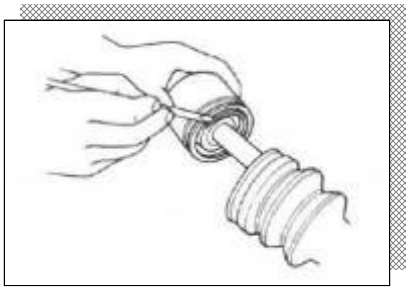
Sliding Hammer

- Remove the boot bands of the differential side joint (double offset joint).



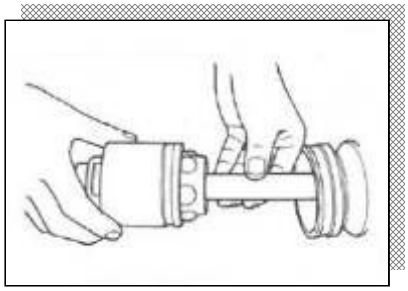
CAUTION
Replace the removed boot bands with new ones.

- Slide the boot toward the center of the front propeller shaft and remove the stopper ring from the outer race.

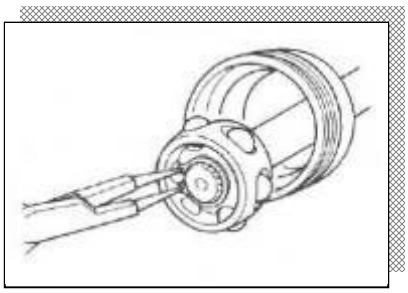


CAUTION
Replace the removed stopper ring with a new one.

- Separate the outer race from the front drive shaft.



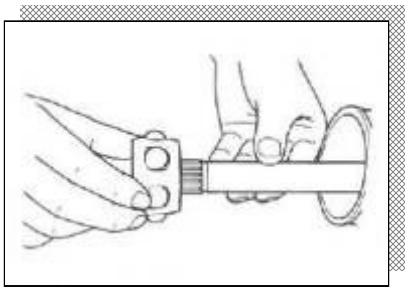
- Wipe off any grease and remove the snap ring.



CAUTION
Replace the removed snap ring with a new one.

● Remove the cage and boot from the front propeller shaft.

CAUTION
Do not disassemble the wheel side joint (ball fixed joint). If any damages are found, replace it with a new one.



Inspection and Reassembly

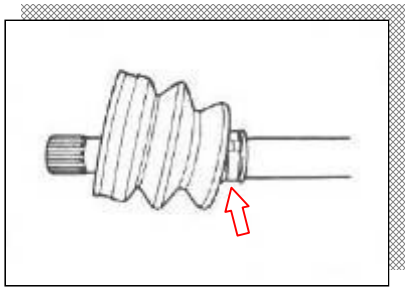
● Inspect the boots for wear or damage. If any damages are found, replace them with new ones.

● Inspect the axle play by using a push-and-pull motion given to the axle shaft and wheel spindle, as shown.

NOTE
○ Wash the disassembled parts (except for the boots). After washing, completely dry the parts using compressed air. ○ Clean the boots with a cloth.

CAUTION
○ Wash all parts before installation, clean the inside and outside of the boots with a cloth. ○ Do not wash the boots in any commercially available degreaser, such as gasoline or kerosene. Washing in a degreaser causes deterioration of the boots.

● Fit a boot on the propeller shaft end, fitting the small diameter side of the boot to the shaft groove, fix its end with a new band

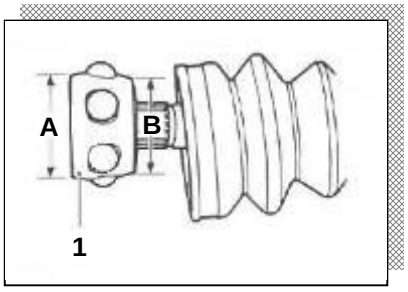


● Install the cage [1] on the shaft.

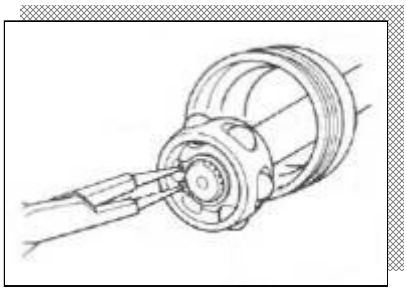
CAUTION
Install the cage with the large diameter side facing the shaft end.

[A] Large Diameter

[B] Small Diameter

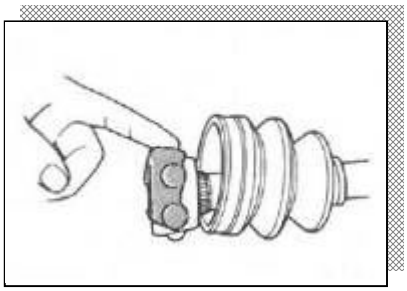


● Install the new snap ring.

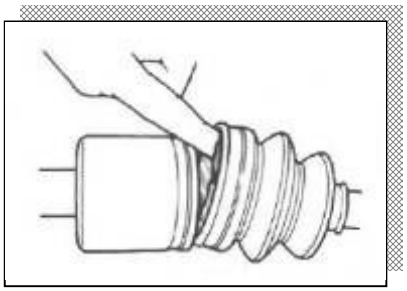


● Apply GREASE to the entire surface of the cage and the inside of t the outer race.

Position / Grease	Wheel side	Differential side
Quantity	45 g	85 g

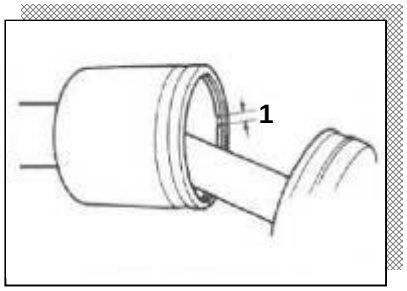


NOTE
The tube of joint grease is included in the wheel side boot set or wheel side joint assembly of spare parts.



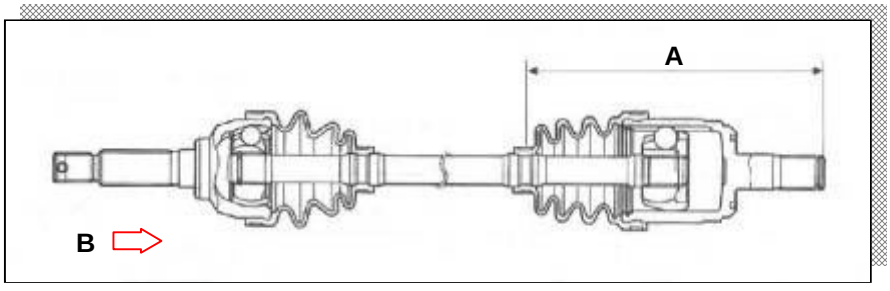
● Insert the cage into the outer race and install the new stopper ring to the groove of the outer race.

CAUTION
Locate the opening of the stopper ring [1] so that the opening is not lined up with a ball.



● After installing the boot on the outer race, insert a screw driver into the boot on the outer race side and allow air to enter the boots so that the air pressure in the boot becomes the same as the atmospheric pressure at the positions indicated in the illustration.

[A] 188 – 198 mm (7.4 – 7.8 in)



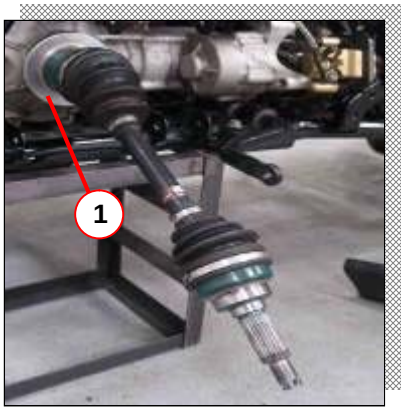
Installation

● Install the front propeller shaft in the reverse order of removal.

Rear Propeller Shaft

Removal

- Remove the rear wheel.
- Remove the rear suspension.
- Hold the in board joint [1] of the rear propeller shaft and tug the propeller shaft horizontally.



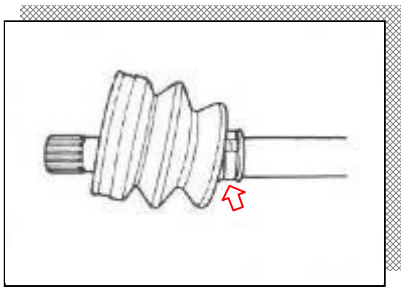
Inspection and Reassembly

- Inspect the boots for wear or damage. If any damages are found, replace them with new ones.
- Inspect the stopper ring, snap ring and boot bands for wear or damage. If any damages are found, replace them with new ones.
- Inspect the axle play by using a push-and-pull motion given to the axle shaft and wheel spindle, as shown.

NOTE
○ Wash the disassembled parts (except for the boots). After washing, completely dry the parts using compressed air. ○ Clean the boots with a cloth.

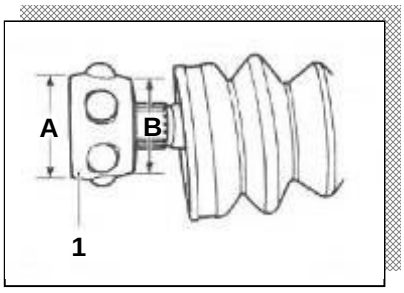
CAUTION
○ Wash all parts before installation, clean the inside and outside of the boots with a cloth. ○ Do not wash the boots in any commercially available degreaser, such as gasoline or kerosene. Washing in a degreaser causes deterioration of the boots.

● Fit a boot on the propeller shaft end, fitting the small diameter side of the boot to the shaft groove, fix its end with a new band.



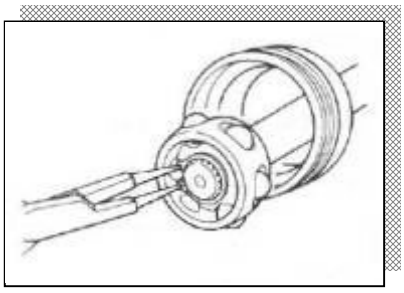
● Install the cage [1] on the shaft.

CAUTION
Install the cage with the large diameter side facing the shaft end.



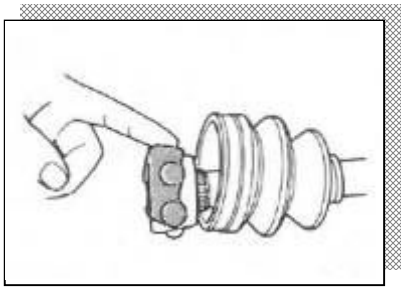
[A] Large Diameter
[B] Small Diameter

● Install the new snap ring.

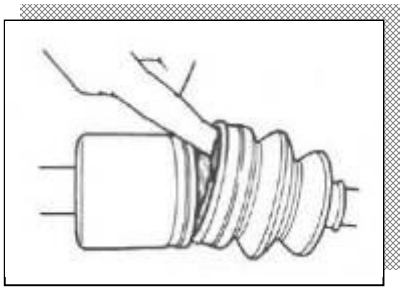


● Apply GREASE to the entire surface of the cage and the inside of the outer race.

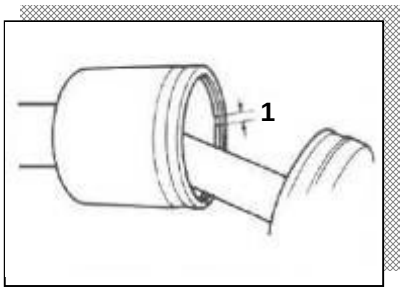
Position / Grease	Outer	Inner
Quantity	45 g	85 g



NOTE
The tube of joint grease is included in the wheel side boot set or wheel side joint assembly of spare parts.



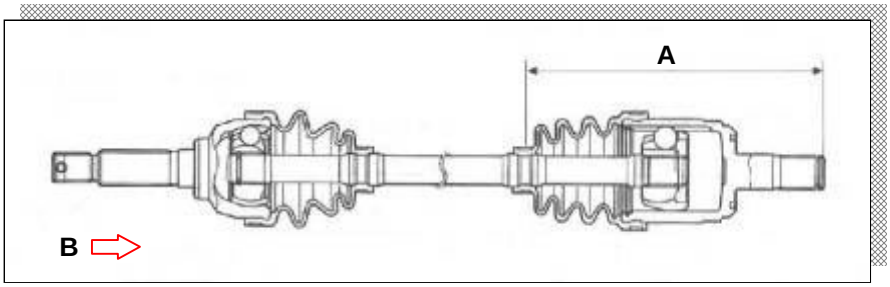
● Insert the cage into the outer race and fit a stopper ring in the groove of the outer race.



CAUTION
Locate the opening of the stopper ring [1] so that the opening is not lined up with a ball.

● After fitting the boot on the outer race, insert a screw driver into the boot on the outer race side and allow air to enter the boot so that the air pressure in the boot becomes the same as the atmospheric pressure at the positions indicated in the illustration.

[A] 188 – 198 mm (7.4 – 7.8 in)

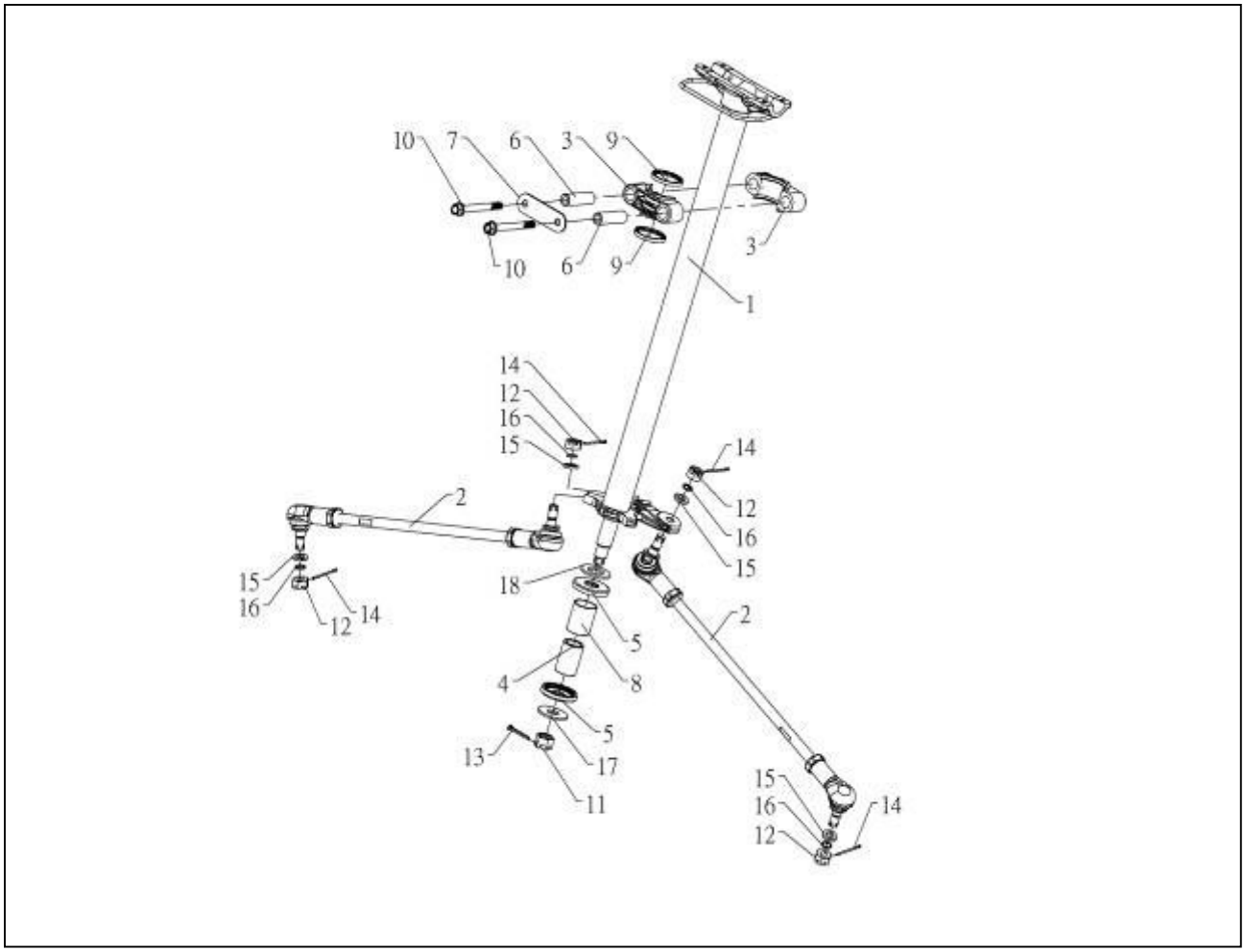


Installation

● Install the rear propeller shaft in the reverse order of removal.

Steering

Construction

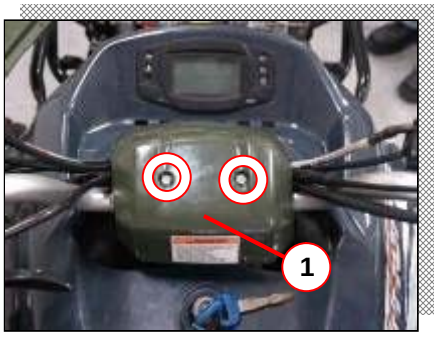


1	Steering shaft	7	Plate	13	Cotter pin
2	Steering Tie-rod assy (2sets)	8	Bush bearing	14	Cotter pin (4pcs)
3	Steering shaft bracket (2pcs)	9	Oil seal (2pcs)	15	Spring washer (4pcs)
4	Pin	10	Hexagonal flange bolt	16	Washer (4pcs)
5	Seal cover (2pcs)	11	Castle nut	17	Washer
6	Spacer (2pcs)	12	Castle nut (4pcs)	18	Washer

Removal and Disassembly

- Remove the front fender.
- Remove the front wheels/tires.

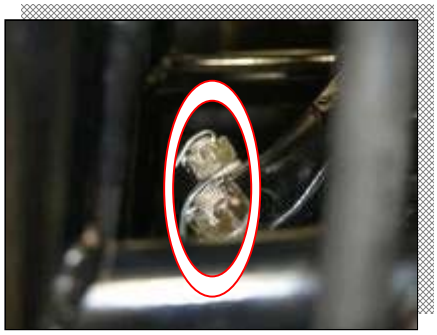
- Remove the handlebar holder cover [1].



- Remove the handlebar clamp bolts.
- Remove the wire rope that from the handlebar assembly.
  (See Handlebar Removal)
- Remove the handlebar upper clamps [A].
- Remove the handlebar.

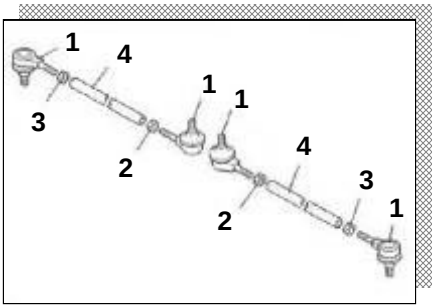
- Remove the cotter pins and tie rod end nuts.

CAUTION
Replace the removed cotter pins with new ones.



- Separate the tie rod ends [1], nuts [2] and [3], and tie rods [4].

CAUTION
The locknuts [2] have left-hand threads.



● Remove the cotter pin and steering shaft lower nut and washer.

CAUTION
Replace the removed cotter pin with a new one.

● Remove the steering shaft bracket bolts.

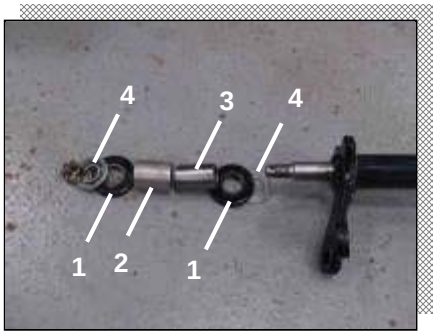
● Remove the steering shaft brackets, spacers, oil seals and plate.

● Remove the steering shaft.

CAUTION
Replace the removed oil seals with new ones.

● Remove the seal cover [1], pin [2], bush bearing [3] and washer [4].

CAUTION
Replace the removed seal cover with a new one.

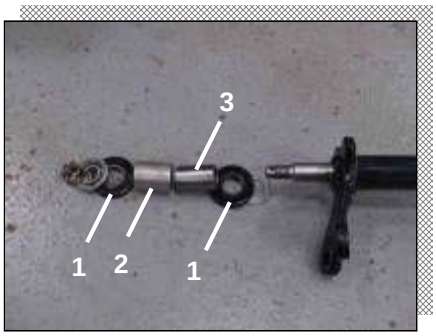


Inspection

● Inspect the handlebar clamp for wear or damage. If any damages are found, replace the clamp with a new one.

Seal Cover and Bush Bearing

● Inspect the seal covers [1], pin [2] and bush bearing [3] for wear or damage. If any damages are found, replace them with new ones.



Tie Rod

● Inspect the tie rod for distortion or damage. If any damages are found, replace it with a new one.

Tie Rod End

● Inspect the tie rod ends and boots for smooth movement. If there are any abnormalities, replace them with new ones.

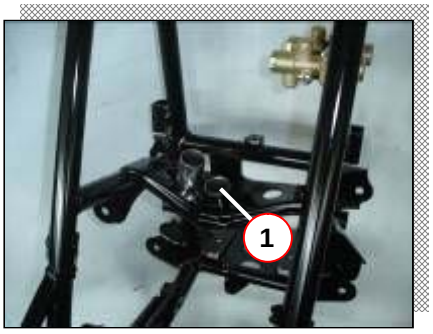
Steering Shaft and Bracket

● Inspect the steering shaft for distortion or bends. If any damages are found, replace it with a new one.

● Inspect the steering shaft brackets for wear or damage. If any damages are found, replace them with new ones.

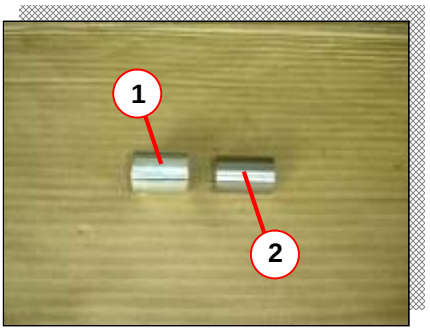
Steering Shaft Bush Bearing

- Inspect the steering shaft bush bearing [1] for wear and damage. If any damages are found, replace it with new one.



- Inspect the steering shaft seal cover for any scratches or other damage. If any damages are found, replace the shaft seal cover with new ones.

- Inspect the steering bush bearing [1] and pin [2] for any scratches or other damage. If any damages are found, replace them with ones.



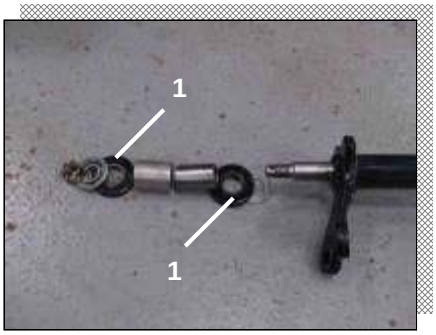
Reassembly and Installation

● Reassemble and install the steering in the reverse order of removal and disassembly. Pay attention to the following points.

Steering Shaft

● Apply GREASE to the seal cover [1] before installing the steering shaft.

● Install the seal cover [1] to the steering shaft.

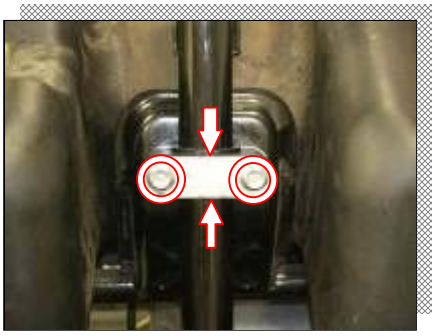


● Apply GREASE to the steering shaft bracket and oil seals before installing the steering shaft bracket.

● Install the steering shaft.

● Tighten the steering shaft bracket bolts to the specified torque.

Tightening Torque: 23 N-m (2.3 kgf-m, 16.5 lb-ft)



NOTE
Make sure that the wiring harness, cables and brake hose routing are proper.

CAUTION
To prevent the entry of dirt, the oil seal end must face forward when installed on the steering shaft.

● Install the steering shaft lower nut with the washer.

● Tighten the steering shaft lower nut to the specified torque.

Tightening Torque: 120 N-m (12.0kgf-m, 87.0 lb-ft)

NOTE
After installing the steering shaft lower nut, install a new cotter pin into the steering shaft.

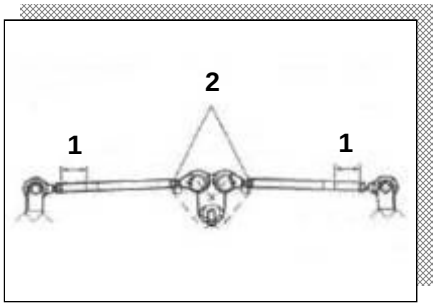
Tie Rod

● Tighten the tie rod end nuts to the specified torque.

Tightening Torque: 29 N-m (2.9 kgf-m, 21.0 lb-ft)

NOTE
After installing the tie rod end nuts, install the new cotter pins into the tie rod ends.

● When installing the tie rods, make sure the short sides [1] of the tie rods come outside.



NOTE
The locknuts [2] have left-hand threads.

Handlebars

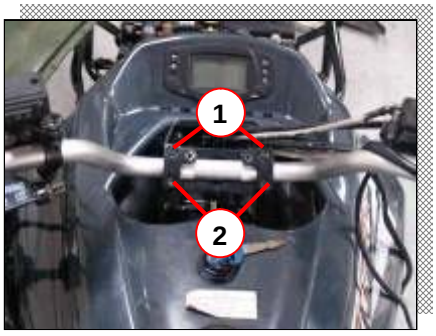
● When installing the handlebars on the handlebar lower clamp, align the brake reservoir on the horizontal direction of the handlebar.

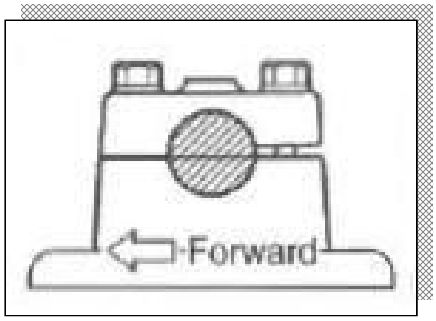
● Install the handlebar upper clamps as shown.

● First, tighten the bolts [1] to the specified torque, and then tighten the bolts [2] to the specified torque.

Tightening Torque: 26 N-m (2.6 kgf-m, 19.0 lb-ft)

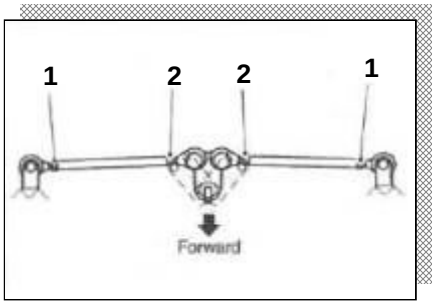
● Make sure the cable, harness and brake hose are routing properly.





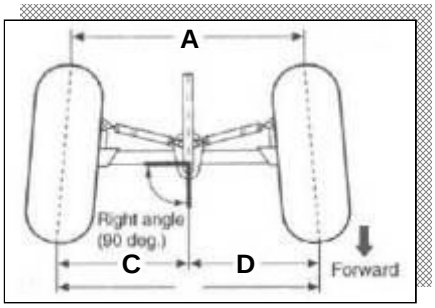
Toe-Out Adjustment

- Adjust the toe-out as follows.
- Place the vehicle on level ground and set the handlebars straight.
- Make sure all the tires are inflated to the standard pressure.
- Place 75 kg (165 lbs) weight on the seat.
- Loosen the locknuts [1], [2] on each tie rod.



NOTE
The locknuts [2] have left-hand threads.

- Measure the distance ([A] and [B]) between the front wheels. Subtract the measurement of [B] from that of [A] to find the toe-out. If the toe-out is not within specification, adjust the tie rod the right or left until the toe-out is within the specified range.



[B] – [A] = Tie-out

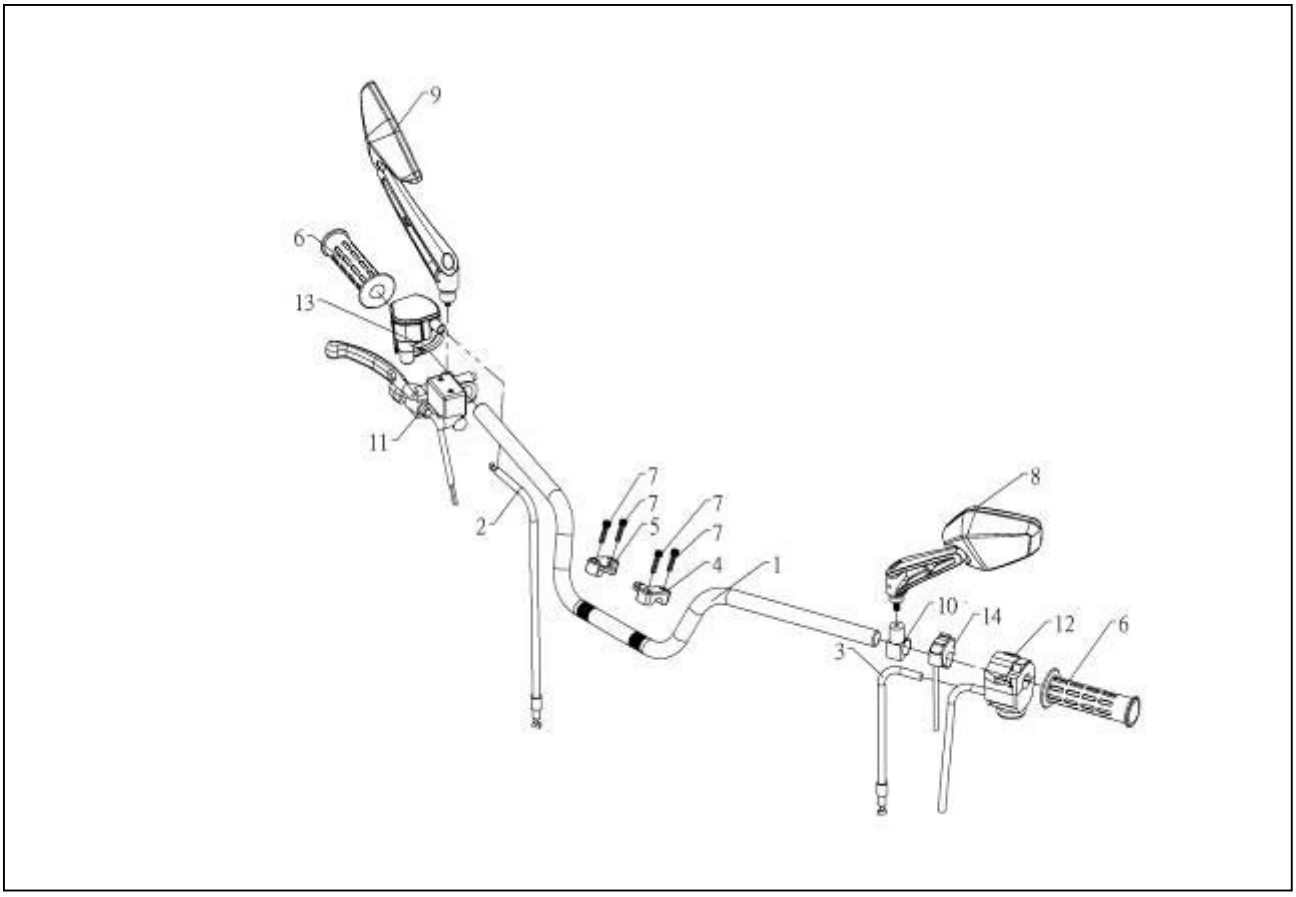
Toe-out	
Standard	10 ± 4 mm (0.39 ± 0.16 in)

- Temporarily tighten the four locknuts.
- Check that the distance ([C] and [D]) are equal, as shown. If the distances are not equal, adjust the tie rod to the right or left until the toe-out is within specification. Check the toe-out again by measuring distances [A] and [B].
- If the toe-out is not within specification, repeat the adjustment as above until the proper toe-out is obtained and distances [C] and [D] become equal.
- After adjustment has been made, tighten the four locknuts [1] to the specified torque.

Tightening Torque: 27 N-m (2.7 kgf-m, 20.0 lb-ft)

Handlebar

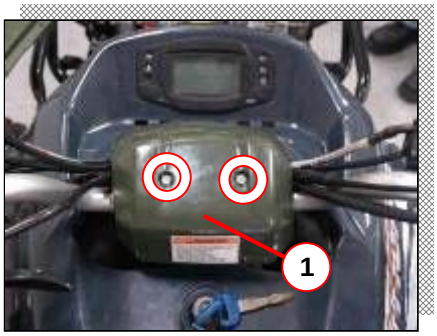
Construction



1	Handlebar	6	Handle grip (2pcs)	11	Right lever assy
2	Throttle wire	7	Hex socket bolt (4pcs)	12	Left lever assy
3	Choke cable	8	Rear-View mirror (L)	13	Right switch
4	Upper handlebar clamp (L)	9	Rear-View mirror (R)	14	Handlebar switch
5	Upper handlebar clamp (R)	10	Mirror holder		

Removal

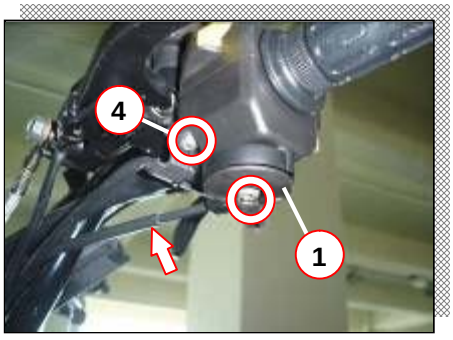
- Remove the handlebar holder cover [1].
- Remove the brake hose.
- Remove the brake master cylinder assembly. (See Brake chapter)

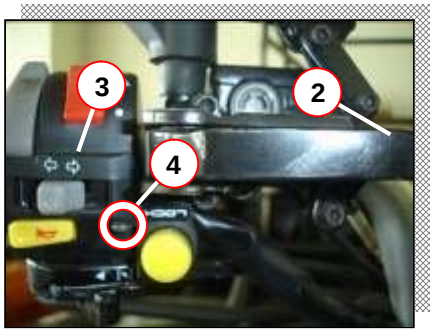


- Remove the throttle wire.

- Remove the right switch assembly.

- Remove the choke cable by removing its cap[1].
- Remove the parking brake cable [2].
- Remove the left lever assembly [3] by removing its screws [4].





- Remove the handlebar clamp bolts [A].
- Remove the upper clamps.
- Remove the handlebar.

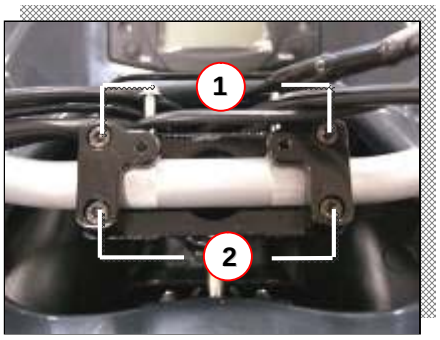
Installation

- Install the handlebar in the reverse order of removal. Pay attention to the following point.

- Install the handlebar so that the angle of the handlebar matches the angle of the steering stem as shown.

- Install the handlebar upper clamps as shown.
- First, tighten the bolts [1] to the specified torque, and then tighten the bolts [2] to the specified torque.

  Tightening Torque: 26 N-m (2.6 kgf-m, 19.0 lb-ft)

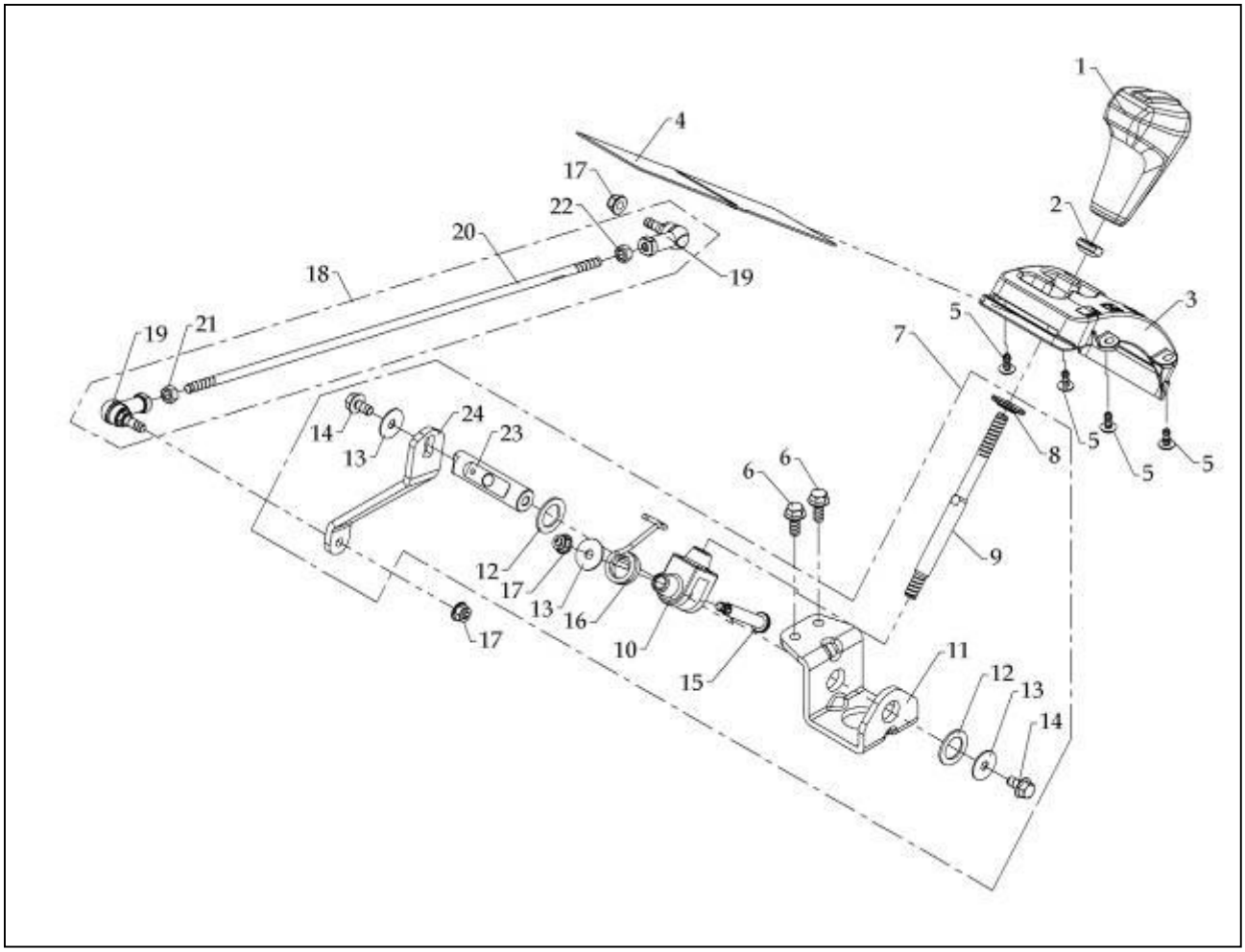


- Make sure the cable, harness and brake hose are routing properly.

CAUTION
When installing the handlebar, Align the brake reservoir on the horizontal direction is necessary

Indicator T/M Lever

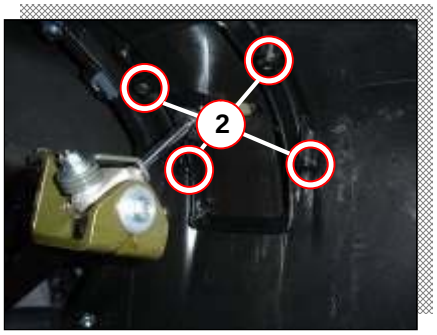
Construction

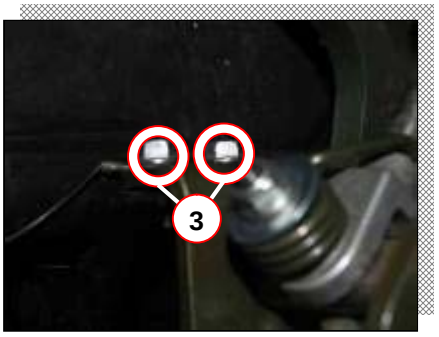


1	T/M lever knob	9	Shift level	17	Hex insert lock nut (3pcs)
2	Nut	10	Indicator T/M level	18	Level assy rod
3	Indicator T/M level	11	Indicator T/M level bracket	19	Tie rod end (2pcs)
4	T/M level cover	12	Spacer (2pcs)	20	Level rod
5	Tapping screw (4pcs)	13	Washer (3pcs)	21	Nut
6	Hex washer face bolt	14	Hex washer face bolt (2pcs)	22	Nut
7	Indicator T/M lever assy	15	Hex socket bolt	23	Level shaft
8	Bushing	16	Spring	24	Level

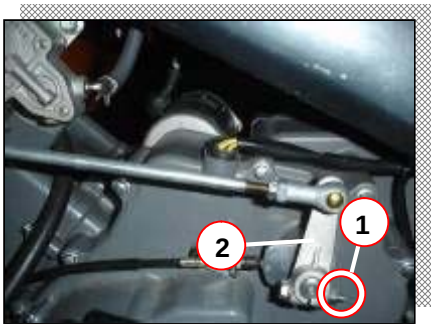
Removal

- Remove the indicator T/M lever knob [1], indicator level tapping screws [2] and mounting bolts [3].





- Loosen the bolt [1] and remove the tie rod end [2].
- Remove the T/M lever assembly.

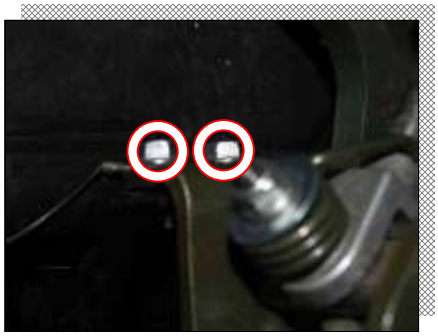


Inspection

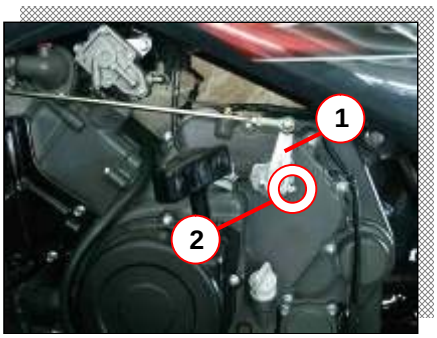
- Inspect the shift lever assembly for wear or damage. If any damages are found, replace it with a new one.

Installation

- Install the indicator T/M lever in the reverse order of removal. Pay attention to the following points.
- Apply GREASE to level shaft.



- Install the T/M lever assembly to the frame bracket.
- Apply THREAD LOCK to the T/M lever assembly mounting bolts.



- Install the tie rod end [1].
- Tighten the bolt [2].

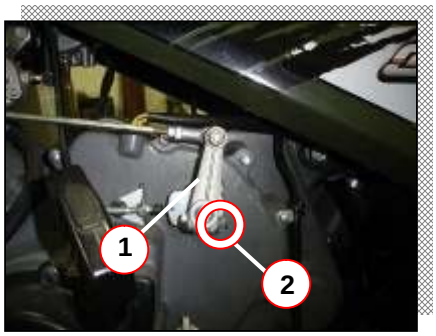
Shift Rod

Installation

● Before removing the T/M lever assembly, keep the tie rod end [1] in the "N" position.

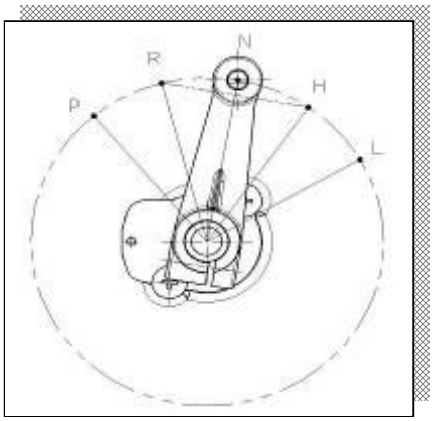
● Install the tie rod end [1] on its shaft.

NOTE
When installing the tie rod end, align the tie rod end's grooves with the spline of the shaft.



● Tighten the bolt [2] securely.

CAUTION
Make sure the installation position of the gear selection arm is accurate.



Shift Rod Adjustment

- Check the position of the gearshift lever, shift the lever to the "N" position and check if the lever moves smoothly as shown in the figure.
- If the lever can not move successfully, measure the tie rod length and adjust the tie rod to the proper position.

- Adjust the tie rod in two positions as shown in the figure.

NOTE
Be careful not to separate the rod from the joint by turning the rod too much.

CAUTION
○ Adjust the tie rod length immediately if it does not conform to the standard, or it will cause the transmission gears to wear or damage.

BODY

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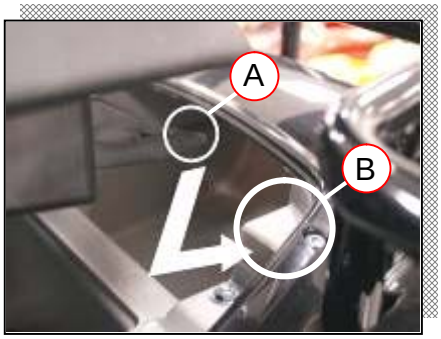
Seat

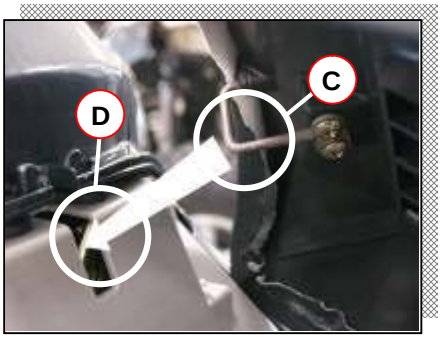
Seat Removal

- To remove seat [A], insert the key to the main switch.
- Push inward the key and turn it counter-clockwise to seat open position [B].
- Lift the seat front slightly, pull it toward the front and remove the seat.

Seat Installation

- Align the catch [A] at the back of the seat with the receiver [B] on the frame.
- Slip the seat hook [C] under seat into lock [D].
- Push the front of the seat until you hear the click sound to lock the seat.

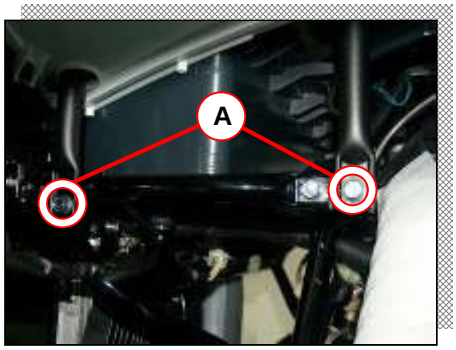




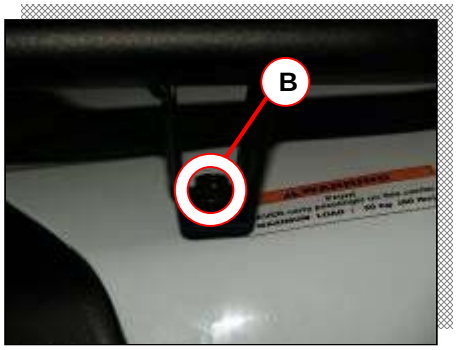
Front and Rear Racks

Front and Rear Racks Removal

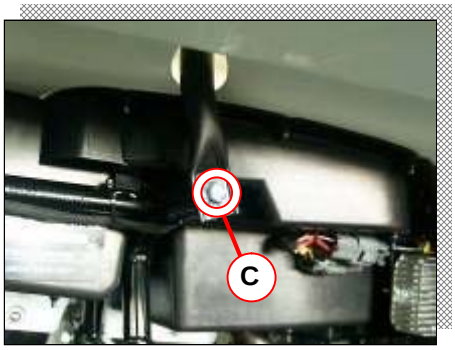
● Remove the front rack by removing its bolts [A] × 4 (left & right).



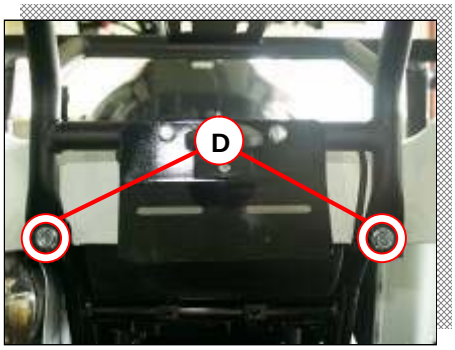
● [B] × 2 (left & right).



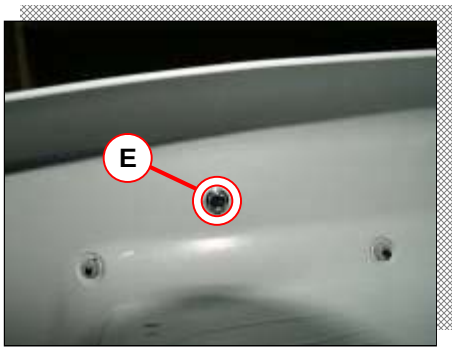
● Remove the rear rack by removing its bolts. [C] × 2 (left & right)



● [D] × 2.



● [E] × 2 (left & right).



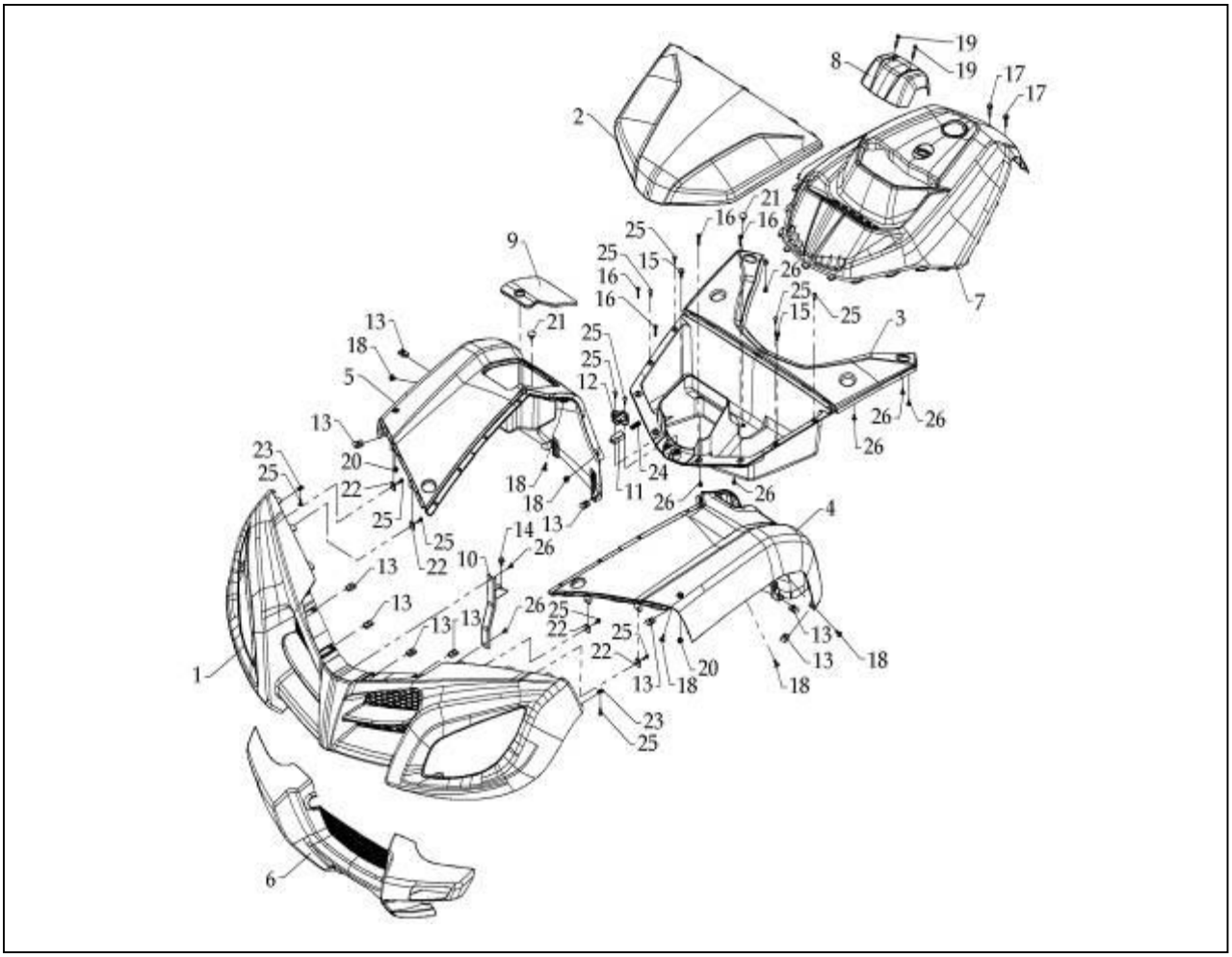
Front and Rear Racks Installation

- Install the front and rear rack in the reverse order of removal.

NOTE
When installing the racks, notice that the difference between front and rear rack.

Front and Rear Fenders

Front Fender Construction

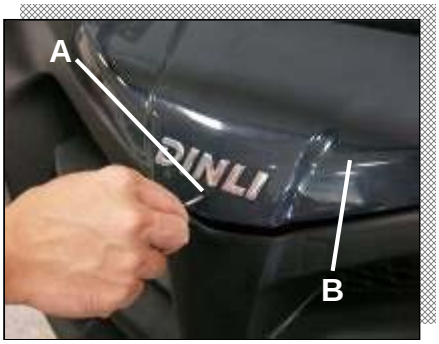


1	Headlight shade	10	Front light cover	19	Hexagonal flange bolt
2	Front fender decoration	11	Hook	20	Hex insert lock nut
3	Maintenance compartment	12	Hook cover	21	Plug
4	Front fender (L)	13	Clip nut (10pcs)	22	Fixed plate (4pcs)
5	Front fender (R)	14	Hex washer face bolt	23	Fixed plate (2pcs)
6	Front fender under cover	15	Hex washer face bolt (2pcs)	24	Spring
7	Fuel tank decoration	16	Screw (4pcs)	25	Tapping screw (12pcs)
8	Handlebar holder cover	17	Hex washer face bolt (2pcs)	26	Tapping screw (8pcs)
9	Glove compartment cover	18	Machine screw (6pcs)		

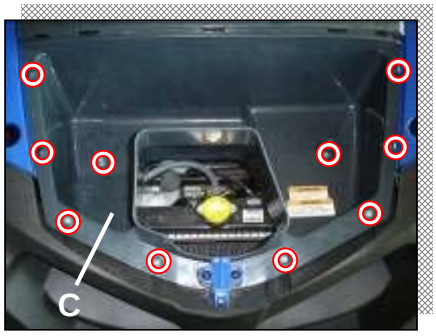
Front Fender Removal

Maintenance Compartment

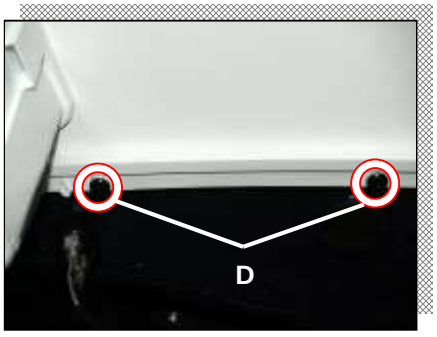
- Remove the front rack. (See 5-3)
- Remove front fender decoration [B] by inserting the opening stick into the hole [A] to open it.



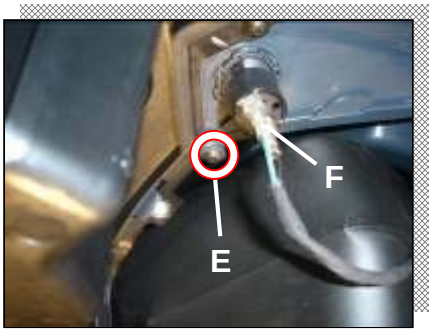
- Remove the maintenance compartment [C] by removing its screws and bolts.



- [D] × 4 (left & right) (attach to the front fender).

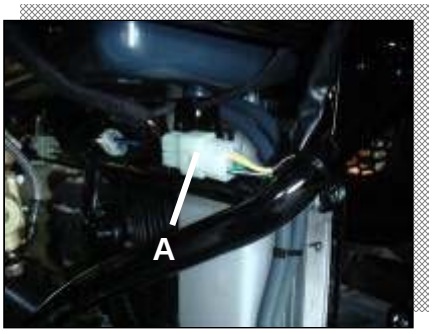


- [E] × 2 (left & right) (attach to the body decoration).
- Remove the lead wire of the accessory socket [F].

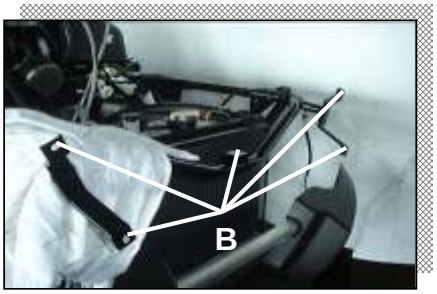


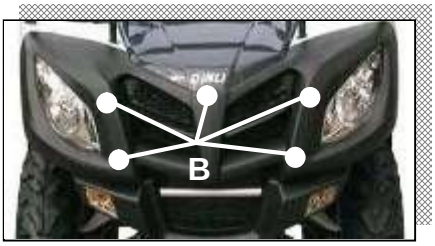
Headlight Shade

- Remove the front rack. (See 5-3)
- Remove the front fender decoration. (See 5-6)
- Remove the headlight lead wire coupler [A].
- Remove headlight shade by unscrew the screws

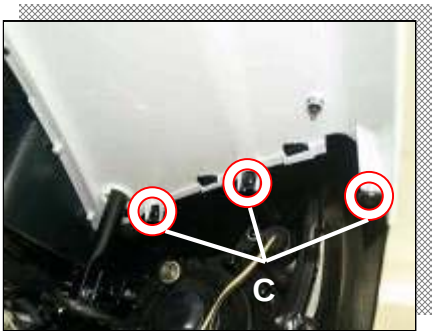


- [B] × 5.



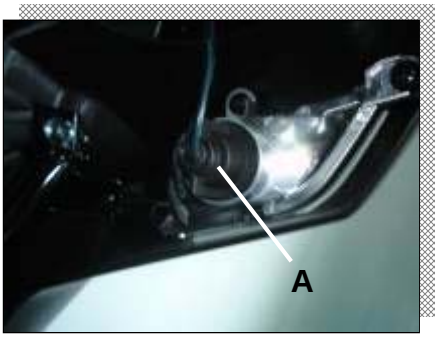


- [C] × 6 (left & right) (attach to the front fender).

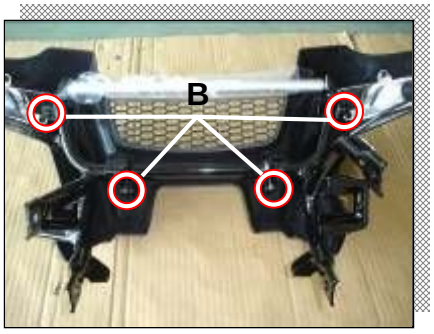


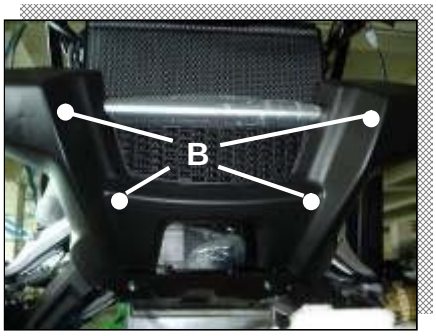
Front Fender Under Cover

- Remove the indicator bulb [A]. (See Electrical System)



● Remove the under cover of front fender by unscrew the screws [B] × 4





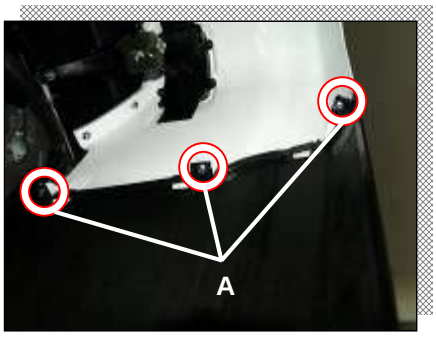
Front Fender (Left & Right)

● Remove the front rack. (See 5-3)

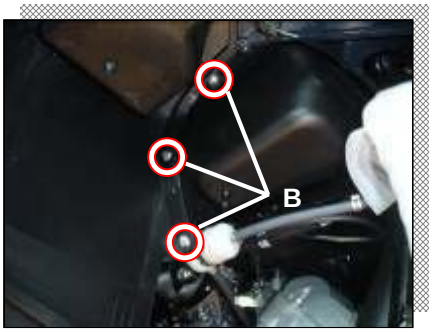
● Remove the maintenance compartment. (See 5-6)

● Remove the headlight shade. (See 5-7)

● Remove Left and Right Fender by removing:
[A] × 6 (left & right) (attach to the footboard).



● [B] × 6 (left & right) (attach to the body decoration).



Fuel Tank Decoration

- Remove the seat.
- Remove the handlebar. (See Suspension chapter)
- Remove the combination meter. (See Electrical System)
- Remove the front fender (left & right).
- Remove the maintenance compartment. (See 5-6)
- Remove the ignition switch decoration [A] and the fuel tank cap [B].

- Remove the fuel tank decoration by removing its bolts (attach to the luggage compartment).

Fuel Tank

- Remove the fuel tank decoration. (See 5-9)
- Disconnect the Fuel level indicator lead wire [A].
- Remove the seat hook wire rope [B].

- Remove the fuel hose.

CAUTION
When removing the fuel hose, place a container under the fuel hose and the fuel tank to drain off the fuel.

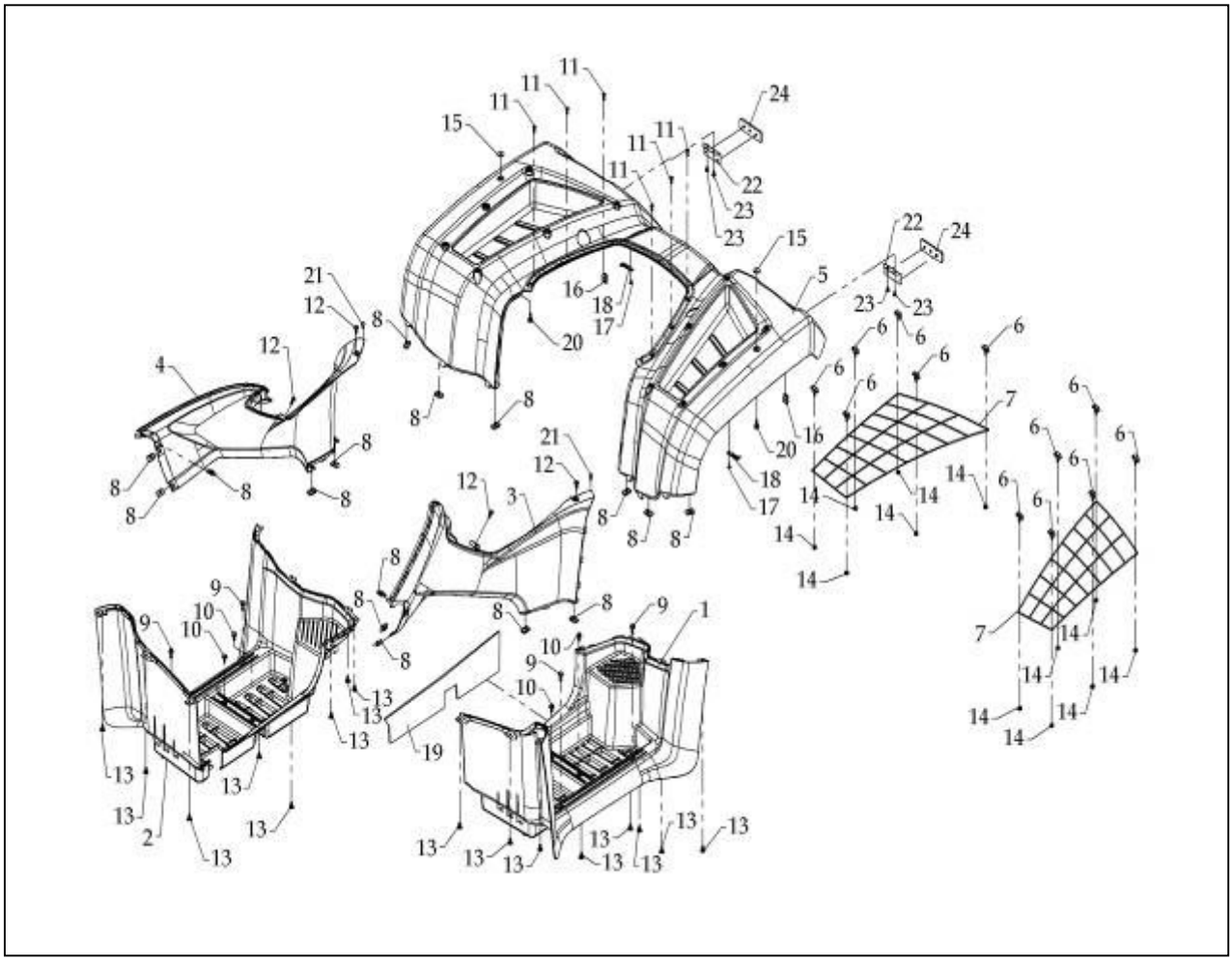
⚠ WARNING
Gasoline is highly flammable and explosive. Keep heat, spark and flame away.

● Remove the fuel tank by removing its bolts.

Front Fender Installation

● Please reverse the Removal steps to install.

Rear Fender Construction

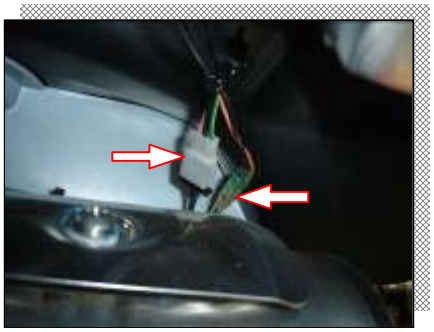


1	Left foot board	9	Hex washer face bolt (4pcs)	17	Tapping screw (2pcs)
2	Right foot board	10	Hex washer face bolt (4pcs)	18	Clip (2pcs)
3	Left body decoration	11	Screw (6pcs)	19	Heat insulation pad
4	Right body decoration	12	Pan head bolt (4pcs)	20	Hex washer face bolt (2pcs)
5	Rear fender	13	Machine screw (16pcs)	21	Tapping screw (2pcs)
6	Clip (12pcs)	14	Net (12pcs)	22	Reflector bracket (2pcs)
7	Cargo nets	15	Rubber washer (2pcs)	23	Tapping screw (4pcs)
8	Clip nut (16pcs)	16	Clip nut (2pcs)	24	Reflector (2pcs)

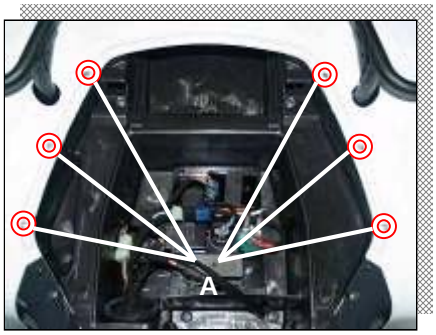
Rear Fender Removal

Rear Fender

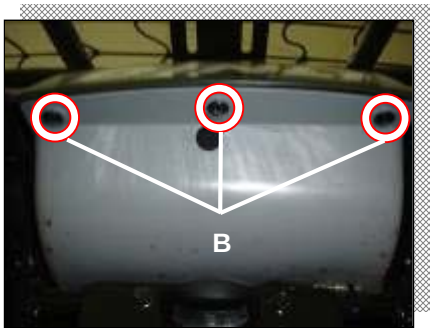
- Remove the seat (See 5-2) and rear rack. (See 5-3)
- Remove the taillight lead wire coupler (left & right).



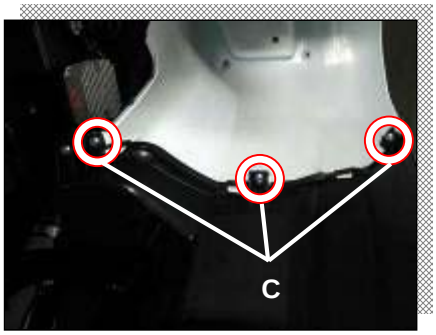
- Remove the rear fender by removing:
  [A]×6 (attach to luggage compartment).



- [B]×3 (attach to luggage compartment).



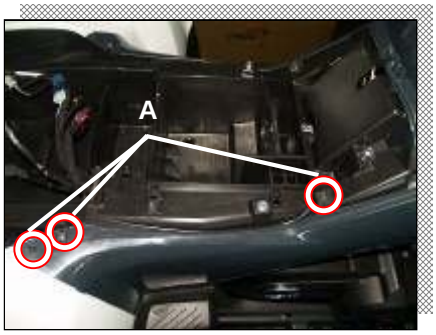
- [C] ×6 (right×3, left×3, attach to footboard).



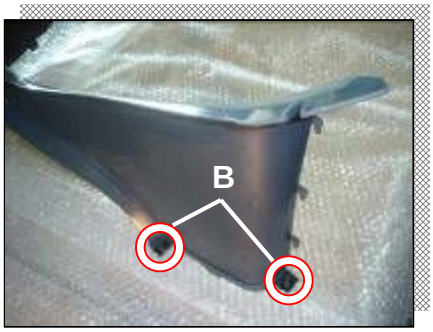
Body Decoration

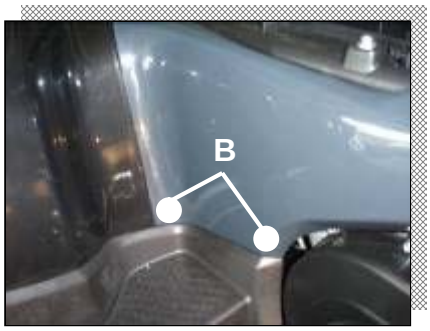
● Remove the front fender. (See 5-8)

● Remove the body decoration screws [A] × 6 (left & right).



● Remove the body decoration by removing screws [B] × 4 (left & right) (attach to the foot board).

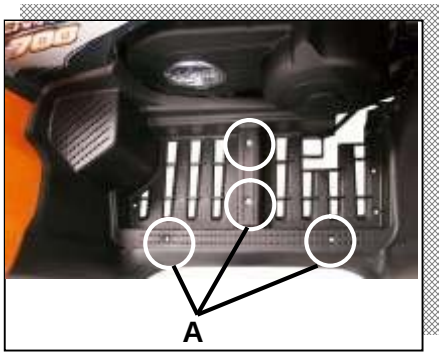




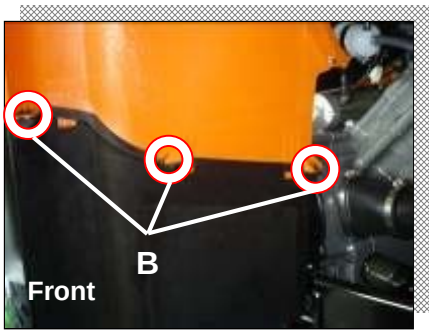
Foot Board

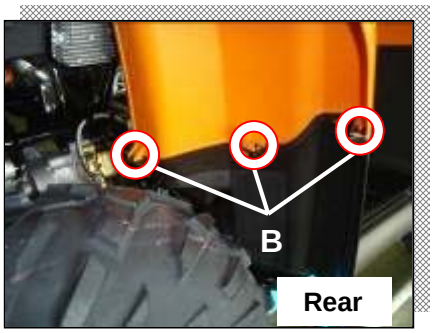
● Remove the foot board by removing:

Foot Board Bracket Bolts [A] × 8 (left & right)

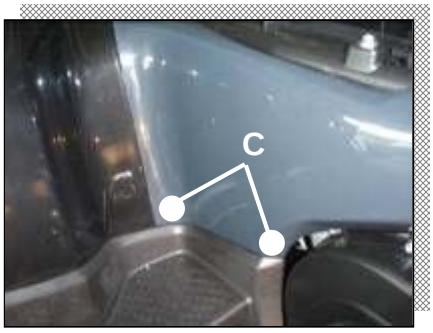


● [B] ×12 (left & right) (attach to front & rear fender).





● Washer bolts [C] × 4 (attach to the body decoration). (See 5-13)



Footrest

● Remove the footboard. (See 5-13)

● Remove the footrest mounting bolts.

● When installing the footrest by its mounting bolts, tighten them to the specified torque.

Tightening Torque: 55 N-m (5.5 kgf-m, 40.0 lb-ft)

Rear Fender Installation

● Please reverse the Removal steps to install.

Luggage Compartment

Luggage Compartment Removal/Installation

- Remove the air cleaner by removing its box and bolts:
- Remove the battery.
- Remove the electrical relays and units.

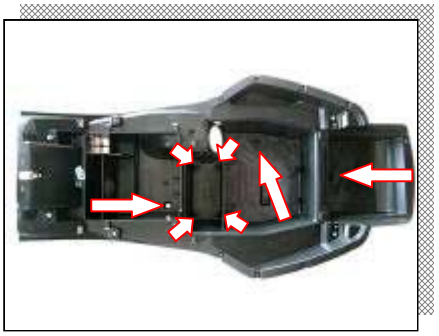
- Remove the fuel tank decoration. (See 5-9)
- Remove the seat hook wire rope. (See 5-9)
- Remove the rear fender. (See 5-12)
- Remove the intake pipe clamp.

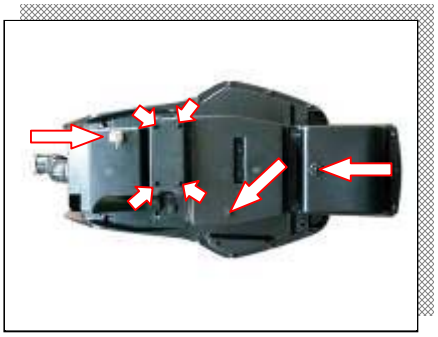
- Remove the luggage compartment by removing its bolts.

- Install the luggage compartment in the reverse order of removal.

Drainage Plug Inspection

- Check the drainage plug and the compartments for accumulating water.
- If the water had been accumulated, drain the water and clean the compartments.

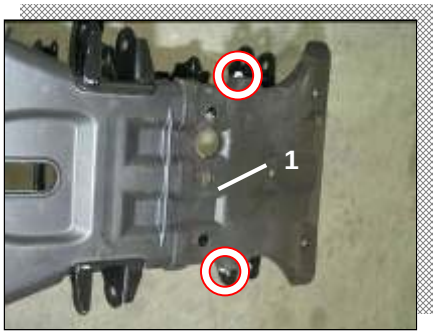


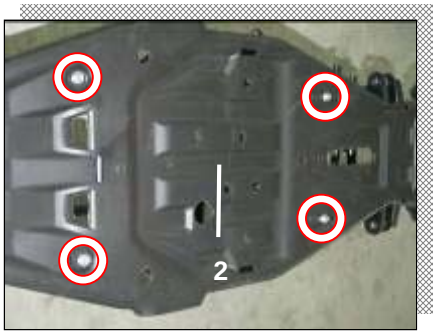


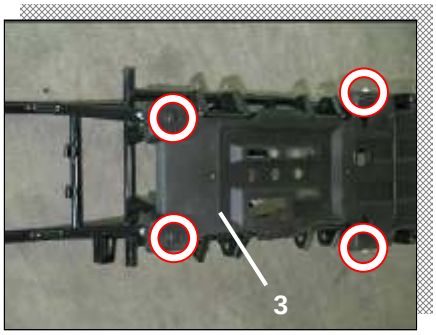
Protector

Protector Removal/Installation

● Remove the front [1], engine [2] and rear protector [3] by removing its bolts.







● Install the protector by installing their bolts.

ENGINE

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Removal and Installation

Engine Removal

- Thoroughly clean the ATV engine and chassis.
- Clean work area.
- Drain coolant and engine oil.
- Remove the seat.
- Remove the side fenders.
- Remove the rear propeller shaft.

- Disconnect the battery lead wires

CAUTION
When disconnecting the battery lead wires, be sure to disconnect the ⊖ battery lead wire first.

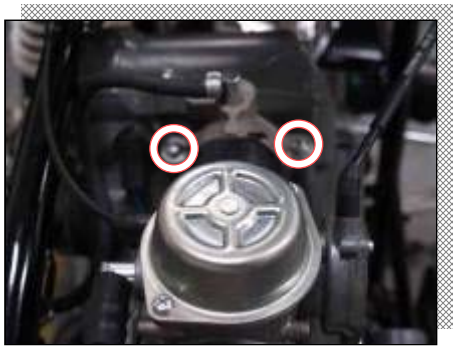
- Remove front and rear rack and fender.

- Remove the water hoses.

● Remove Oil pressure gauge coupler [1] and Coolant Temperature sensor coupler [2].

● Remove the air cleaner box.

● Remove the carburetor.

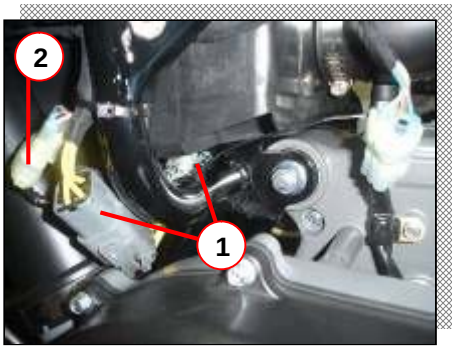


● Remove fuel feeding hoses.

- Remove Stator assembly coupler [1] and Speed Sensor coupler [2].
- Remove Tie rod end of lever assembly rod.
- Remove Shift lever assembly [3].
- Remove PCV (Positive Crankcase Ventilation) tube [4].

- Remove Starter Motor assembly coupler [1] and Gear shift indicator coupler [2].

- Remove Regulator/Rectifier coupler [1].
- Disconnect speed sensor coupler [2]



- Remove the CVT ducts. (Breather and outlet)

- Remove the Intake duct.

● Remove the high voltage cable.

● Remove the Exhaust pipe bolts.

● Remove the muffler.

● Remove the right foot board.
● Remove the right foot board bracket bolts [1].
● Remove the right foot board bracket.

● Remove the foot brake pedal.

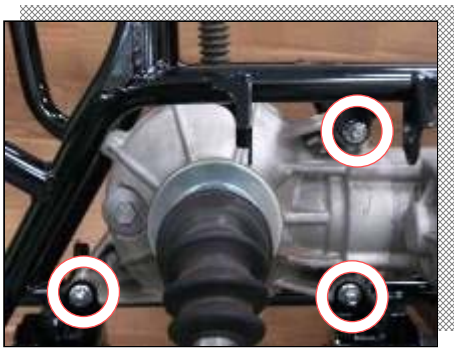
● Remove the front differential mounting bolts/nuts.

● Slide the front differential assy forward.

● Remove the front propeller shaft spring.

● Remove the front propeller shaft.

● Remove the rear gear box bolts/nuts.



- Slide the rear gear box assy backward.
- Remove the rear propeller shaft spring.

- Remove the rear propeller shaft

- Remove the engine mounting bolts/nuts.
- Remove the engine from the right side.

Engine Installation

Remount the engine in the reverse order of engine removal.
Pay attention to the following points:

- Tighten the engine mounting nuts to the specified torque.

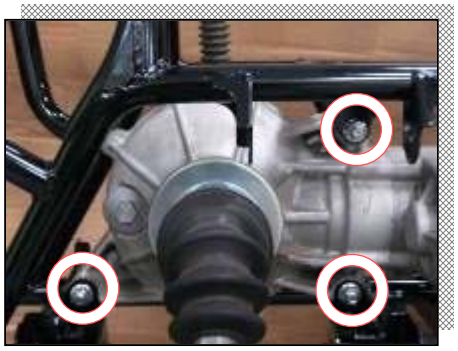
  Tightening Torque: 60N-m (6.0 kgf-m, 43.5 lb-ft)

- When installing the shift lever rod, adjust the tie rod length to the properly position.

- Tighten the rear gear box mounting nuts to the specified torque.

  Tightening Torque: 50N-m (5.0 kgf-m, 36.0 lb-ft)

- Apply THREAD LOCK to the nuts.



- Tighten the front differential gear mounting nuts to the specified torque.

  Tightening Torque: 50N-m (5.0 kgf-m, 36.0 lb-ft)

- Apply THREAD LOCK to the nuts.

- Apply THREAD LOCK to the foot board bracket bolts [1] , and tighten them to the specified torque.

  Tightening Torque: 55N-m (5.5 kgf-m, 40.0 lb-ft)

- Install the new gasket and tighten the muffler bolts and exhaust pipe nuts to the specified torque.

  Tightening Torque: 23N-m (2.3 kgf-m, 16.5 lb-ft)

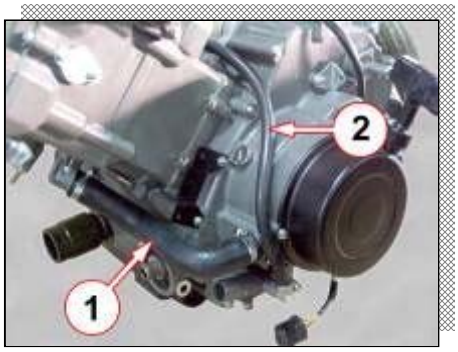
Engine Disassembly

Engine Top Side

● Remove the spark plug

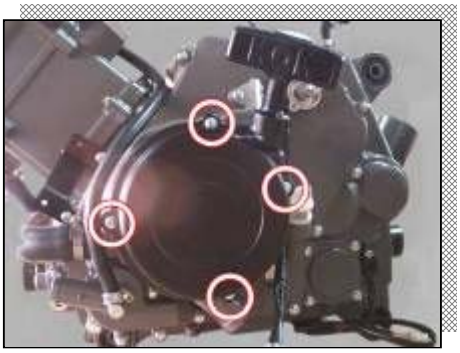
● Remove the start motor.

● Remove water hoses [1] and [2].



● Remove the water union.

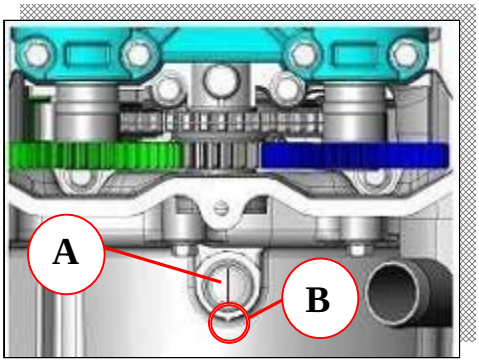
● Remove the recoil starter.

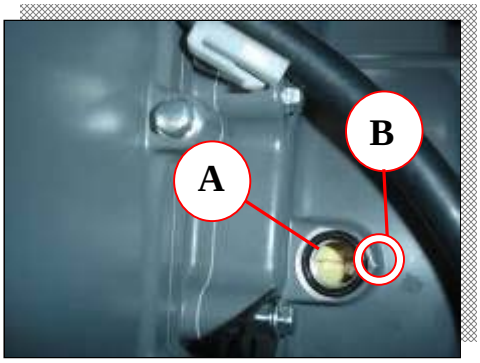


● Remove Timing screen cover.

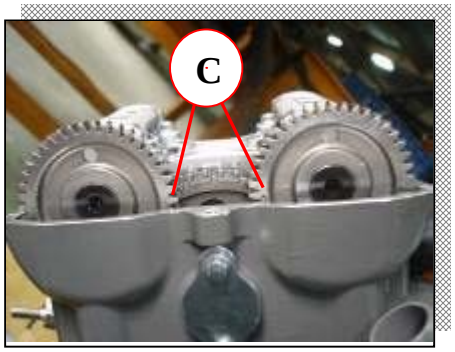
● Remove cylinder head cover.

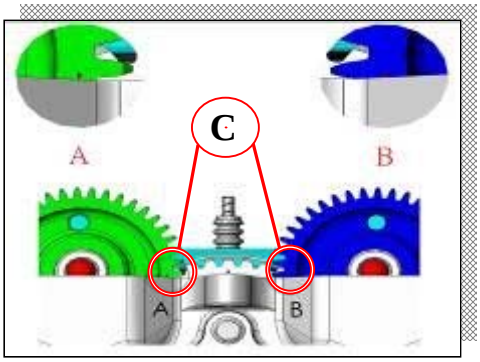
● Turn the crankshaft to bring the "TDC" line [A] on the starter clutch to the index mark [B] of the crankcase.





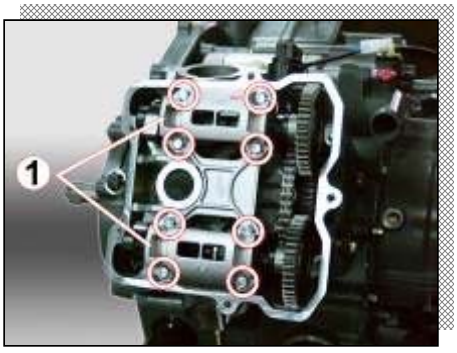
NOTE
At the above condition, the piston is at TDC of compression stroke and also the engraved marks [C] on the camshafts are parallel with the mating surface of the cylinder head cover.





● Remove the camshaft cover bolts [1] and camshaft cover.

CAUTION
Be sure to loosen the camshaft cover bolts evenly by shifting the wrench diagonally.

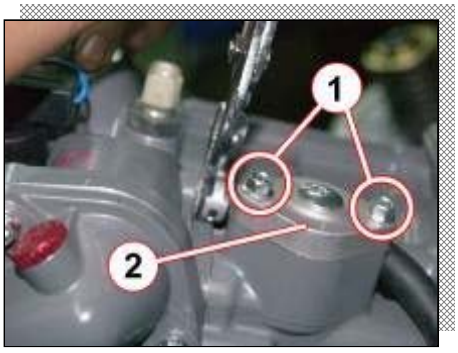


● Remove the pins and camshafts.

NOTE
Be careful not to drop the pins into the crankcase.

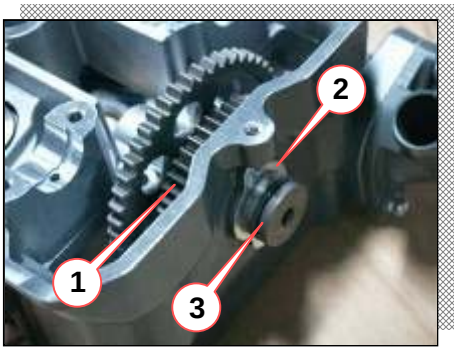
● Remove the cam chain tensioner bolt [1].

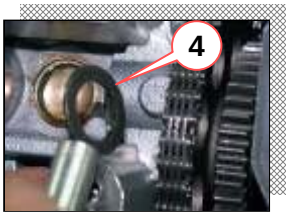
● Remove the cam chain tensioner [2].



● Remove the cam driver gear [1] by removing the shaft cover [2], shaft [3] and the spacer [4].

NOTE
Be careful not to drop the spacer [4] into the crankcase.



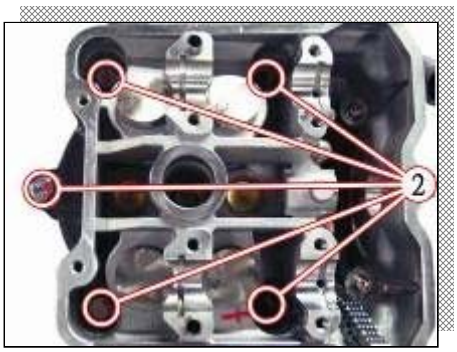


● Remove the cylinder head bolts (M6) [1].

NOTE
Loosen the cylinder nuts.

● Remove the cylinder head bolts (M10) [2] and washers.

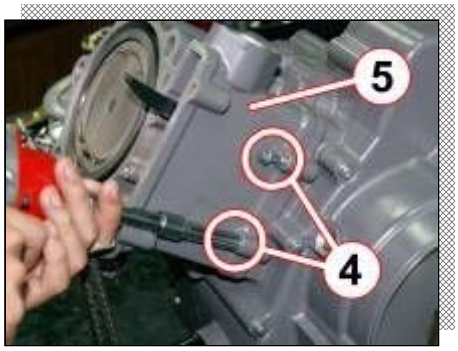
NOTE
When loosening the cylinder head bolts, loosen each bolt little by little diagonally.



● Remove the cylinder head.

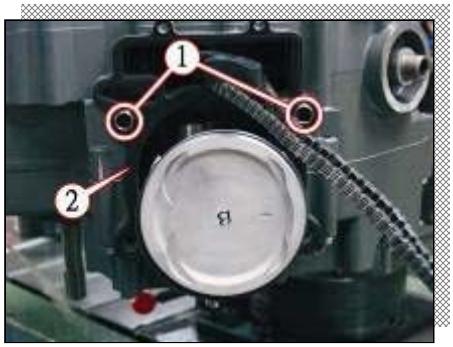
● Remove the dowel pins [1] and cylinder head gasket [2].
● Remove the cam chain guide [3].

● Remove the cylinder nuts [4].
● Remove the cylinder [5].



● Remove the dowel pins [1] and the gasket [2].

NOTE
Be careful not to drop the dowel pins into the crankcase.



● Remove the piston by removing the piston pin circlip [1].

NOTE
Place a clean rag under the piston so as not to drop the piston pin circlip into the crankcase.

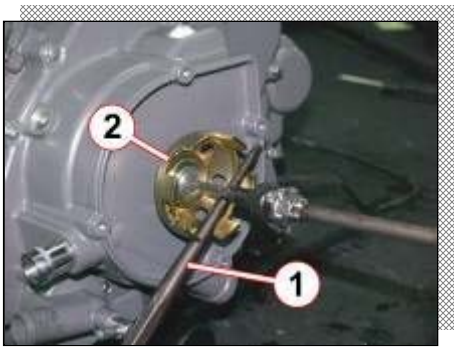
Engine Bottom Side

● Remove the oil filter with the special tool.

● Remove the water pump cover [1].

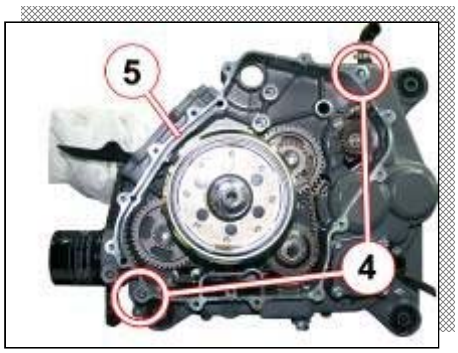
● Remove the starter cup nut with a suitable bar [1].

● Remove the starter cup [2].

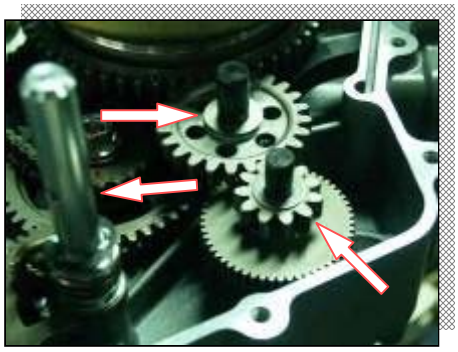


● Remove the left crankcase cover [3].

● Remove the dowel pins [4] and gasket [5].



● Remove the starter reduction gear and gearshift shaft.



● Remove the gearshift shaft [1].
● Remove the gearshift cam driven gear [2] by removing its bolts.

● Remove the generator rotor bolt.

Rotor Mounting Socket Wrench

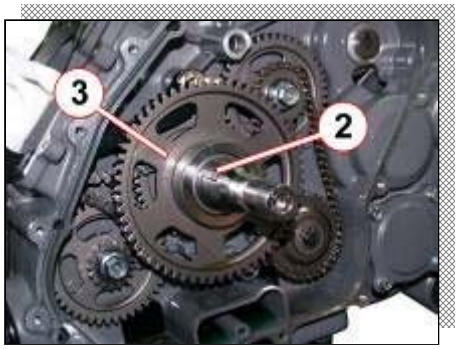
● Install the special tool to the crankshaft end.

D006-Rotor Remover

● Remove the generator rotor with the special tool.

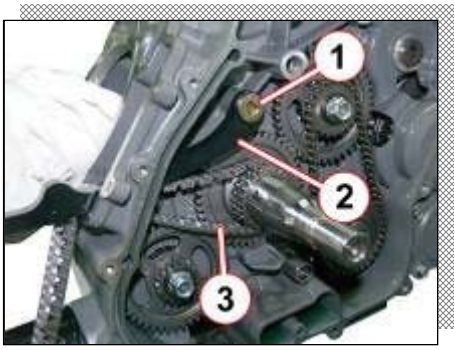
● Remove the key [2].

● Remove the starter driven gear [3].



● Remove the cam chain guide bolt [1], cam chain guide [2].

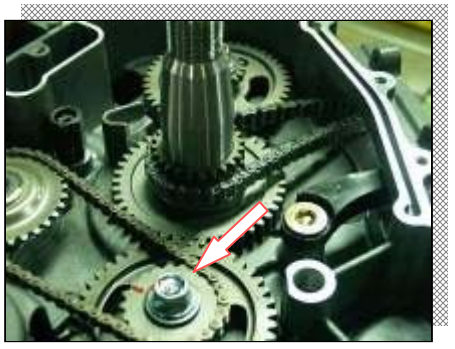
● Remove the cam chain [3].



● Remove the balancer shaft driven gear bolts with the special tool.
Stopper Plate

● Remove the oil pump driven gear.

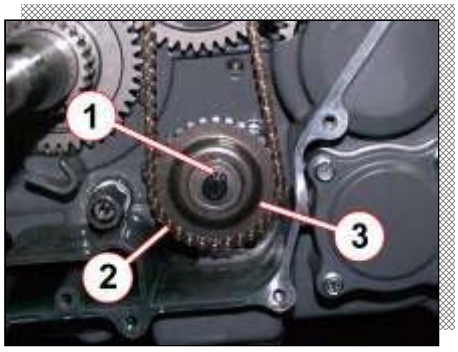
CAUTION
The oil pump drive gear and the oil pump driven gear must removed at the same time.



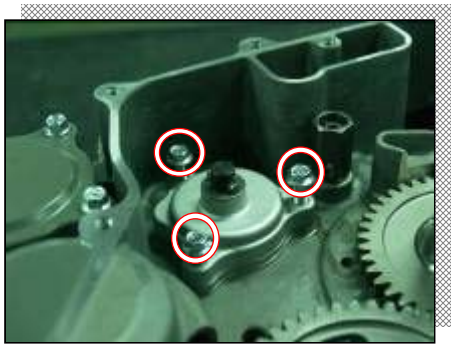
● Remove the snap ring [1].

NOTE
Be careful not to drop the snap ring [1] into the crankcase.

● Remove the oil pump drive chain [2] and oil pump driven gear [3].

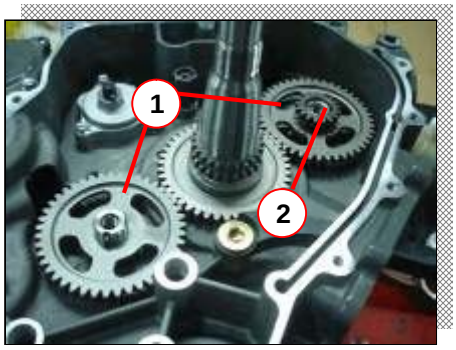


● Remove the oil pump bolts and the oil pump.



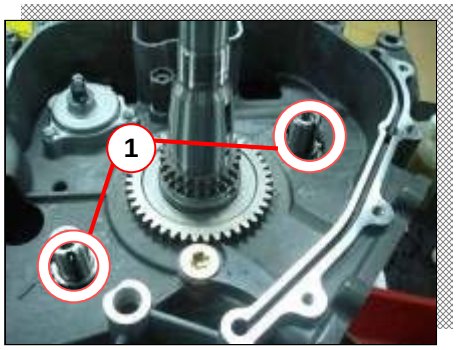
● Remove the balancer shaft driven gears [1].

● Remove the water pump drive gear [2].



.

● Remove the keys [1].



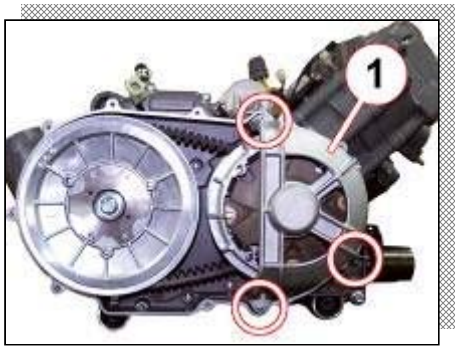
● Remove the cam chain drive gear with the special tools.

Bearing Remover Set

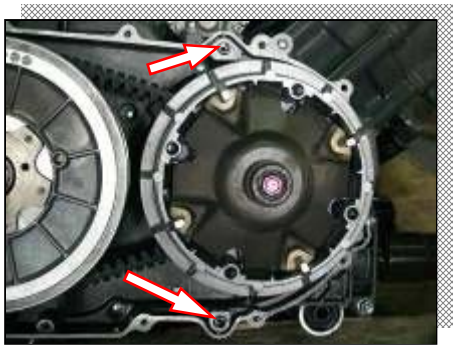
● Remove the pin and crank balancer drive gear.

● Remove the CVT cover [1] and gasket.

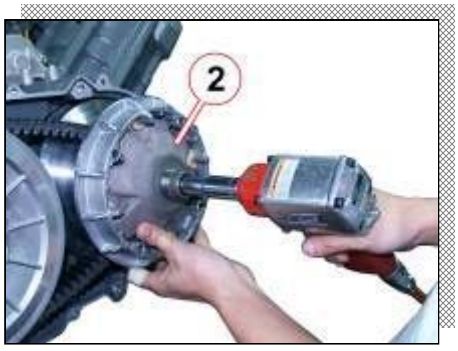
● Remove the movable drive face cover [1].



● Remove the dowel pins.



● Remove the movable drive face [2] by removing the bolt.



● Remove the movable driven face assembly by removing the bolt.

● Remove the drive belt.

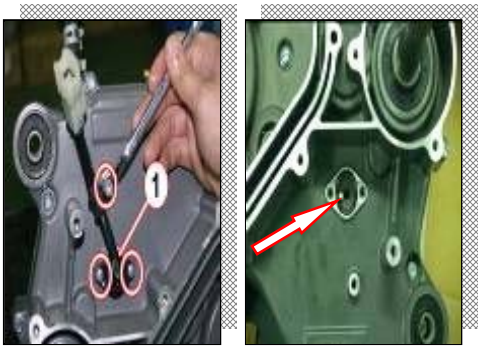
● Remove the fixed drive face.

● Remove the front and rear output connectors.

● Remove the plate [1], CVT inner cover [2] and gasket.

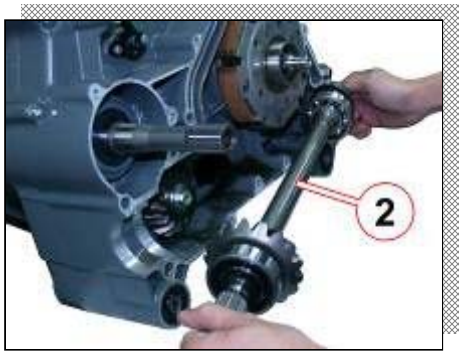
NOTE
Be careful about the size of the bolts (M6&M8), it is necessary to put them in the original position.

● Remove the gear position indicator [1].
● Remove the pin.

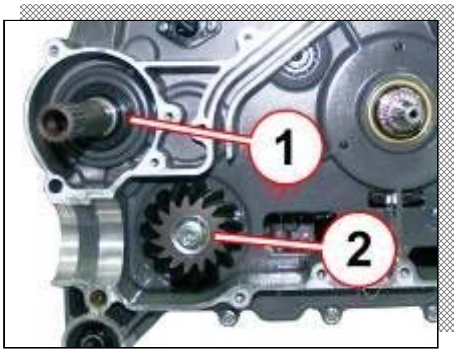


● Remove the clutch housing/shaft [1].

● Remove the output shaft [2].



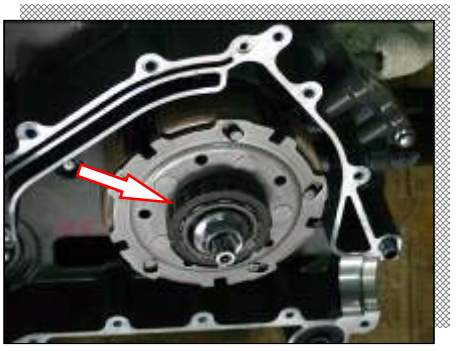
● Remove the collar [1].
● Remove the drive bevel gear [2].



● Remove the dowel pins [1].

● Remove the O ring.

● Remove the one way clutch.



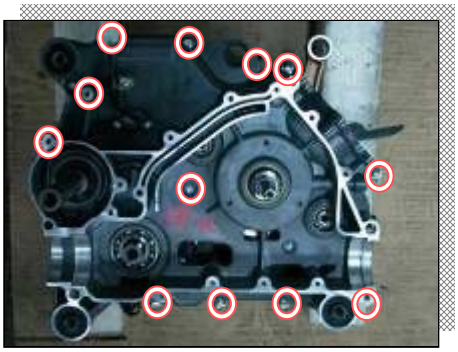
● Remove the clutch shoe nut.

CAUTION
The clutch shoe nut has left-hand threads.

● Remove the clutch shoe with the special tool.

● Remove the right crankcase bolts (M6&M8).

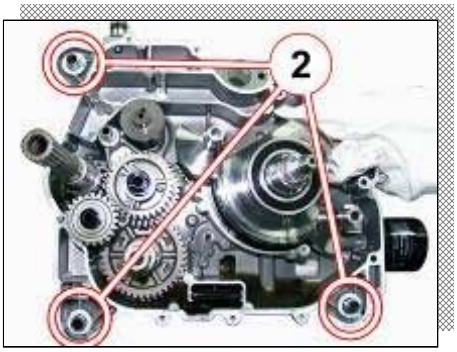
NOTE
○ Loosen the crankcase bolts diagonally with the smaller sizes first. ○ There have two more bolts at the left crankcase, it is necessary to remove them for remove the right crankcase.



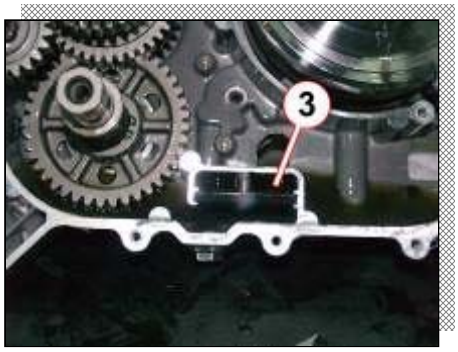
● Separate the right crankcase with the special tool.

NOTE
○ The crankshaft must remain in the left crankcase half.

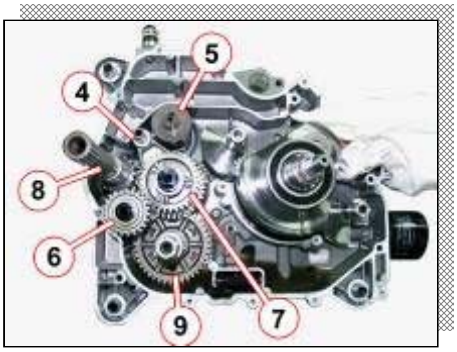
● Remove the dowel pins [2].



● Remove the oil sump filter [3].



● Remove the gearshift fork shaft.
● Remove the gearshift forks [4].
● Remove the gearshift cam drum [5].
● Remove the seminal gear [6].
● Remove the countershaft assembly [7].
● Remove the input main shaft [8].
● Remove the final shaft T/M assembly [9].



CAUTION
○ Do not attempt to disassemble the output driven gear/shaft. ○ The output driven gear/shaft is available only as an assembly.

● Remove the crank balance shafts [1].

● Remove the crankshaft.

INSPECTION

Camshaft and Cylinder Head

Camshaft

NOTE
Identify the original position of disassembled parts, with marking as necessary. Place them in order on the clean table. It is important that buckets are place back in original hole.

Visual Checking

- Check for wear and damage on Cam Sprocket gear teeth.
- Check for wear and damage on decompression related parts.
- Check if decompression would be operated smoothly.
- If any parts would be damaged or worn, replace with new Camshaft Assy.

- Move the automatic decompression weight by hand to inspect if it is operating smoothly.
- If it does not operate smoothly, or the spring occur elastic fatigue, replace the camshaft/automatic decompression assembly with a new one.

Camheight

- Check for damage and wear on cam profile portion.
- Measure the height of cam profile.

Service Limit of cam profile height	
IN	36.150 mm
EX	35.100 mm

CAUTION
Do not attempt to disassemble the camshaft. It is not serviceable.

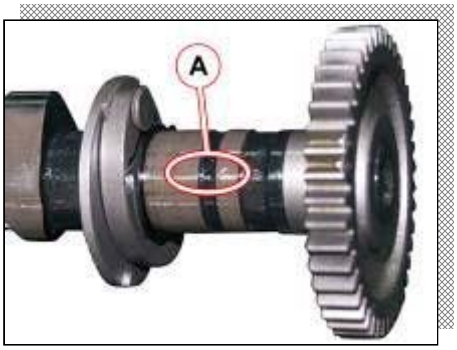
Micrometer (25 – 50 mm)

Camshaft journal wear

- Determine whether or not each journal is worn down to the limit by measuring the oil clearance with the camshaft installed in place.
- Use the plastigauge [A] to read the clearance at the widest portion.

Oil clearance at cam journal portion	
Service Limit	0.150 mm

NOTE
Install camshaft journal holders to their original positions.

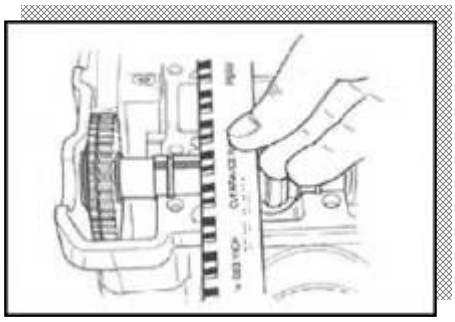


Plastigauge

● Tighten the camshaft journal holder bolts evenly and diagonally to the specified torque.

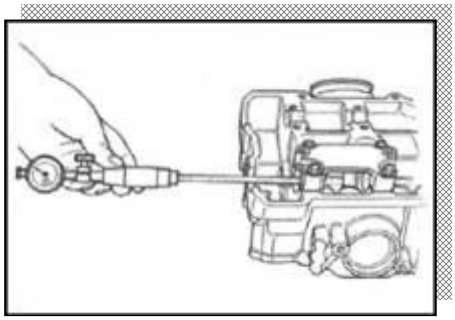
Tightening Torque: 10N-m (1.0 kgf-m, 7.0 lb-ft)

NOTE
Do not rotate the camshaft with the plastigauge in place.



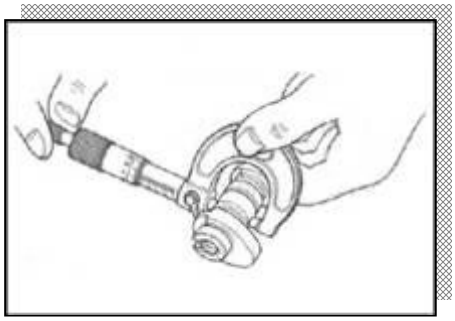
● Remove the camshaft holders, and read the width of the compressed plastigauge with envelope scale.
● This measurement should be taken at the widest part.

● If the camshaft journal oil clearance measured exceeds the limit, measure the inside diameter of the camshaft journal holder and outside diameter of the camshaft journal.
● Replace the camshaft or the cylinder head depending upon which one exceeds the specification.



ID of cam journal portion	
Standard (IN & EX)	23.000 - 23.021 mm

Small Bore Gauge (18 – 35 mm)
Dial Gauge (1/1000 mm, 1 mm)

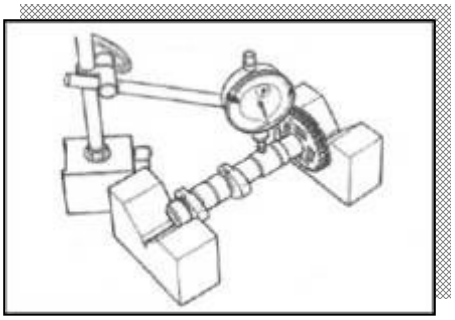


OD of Camshaft journal portion	
Standard (IN & EX)	22.959 - 22.980 mm

Micrometer

Camshaft Runout

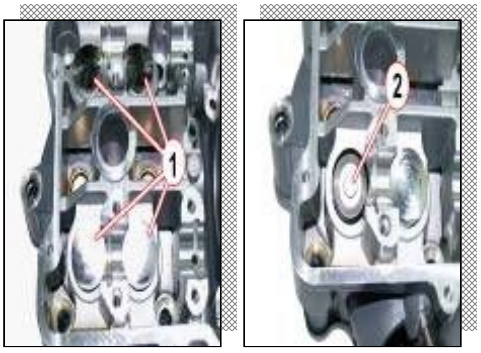
● Measure the runout from using the dial gauge.
● Replace the camshaft if the runout exceeds the limit.



Service Limit Of Camshaft Runout	
IN & EX	0.10 mm

Dial Gauge (1/1000 mm, 10 mm)
Magnetic Stand
V-block Set (100 mm)

Cylinder head



● Remove tappets [1] and shims [2].

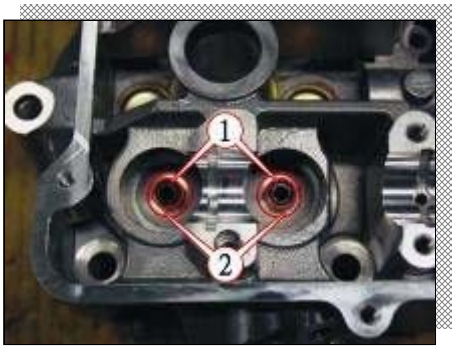
● Use special tools, compress the Valve Spring and remove the valve keeper.

● Remove the spring retainer and valve spring.

D005_01-Valve Lifter Attachment

D005_02-Valve Lifter

● Pull out the valve [3] from the combustion chamber side.



● Remove oil seals [1] and spring seats [2].

NOTE
Do not reuse the removed oil seals.

Cylinder head distortion

● Clean and remove carbon deposits from the surface. Never damage the surface when cleaning.

● Place straightedge on the surface, and check with thickness gauge.

● If the result is out of specifications, replace with new Cylinder Head.

Cylinder Head Distortion	
Service Limit	0.05 mm

Thickness Gauge

Valve Stem runout

- Remove carbon deposits.
- Place on the V-block.
- Measure the runout by means of dial gauge.
- If the result is out of specifications, replace with new Valve.

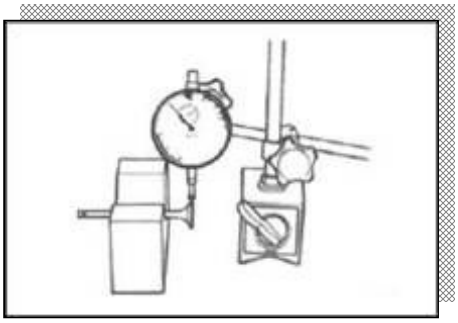
Valve Stem runout	
Service Limit	0.05 mm

Dial Gauge (1/100 mm)

Magnetic Stand

V-block set (100mm)

Valve head radial runout



- Place the dial gauge at right angles to the valve head face, and measure the valve head radial runout.
- If it measures more than the limit, replace the valve.

Service Limit Of Valve head radial runout	
IN & EX	0.03 mm

Dial Gauge (1/100 mm)

Magnetic Stand

V-block set (100mm)

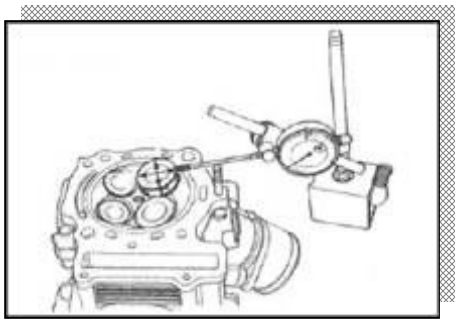
Valve face wear

- Inspect each valve for wear of its seating face. Replace any valve with an abnormally worn face.
- Measure the thickness, and if it measures less than the limit, replace the valve.

Service Limit of Valve head thickness	
IN & EX	0.5 mm

Vernier Calipers

Valve stem deflection



- Lift the valve about 8 mm from the valve seat. Measure the valve stem deflection in two directions, perpendicular to each other, by positioning the dial gauge.
- If the deflection measured exceeds the limit, then determine whether the valve or the guide should be replaces with a new one.

Service Limit of Valve stem deflection	
IN & EX	0.35 mm

Dial Gauge (1/100 mm)

Magnetic Stand

Valve stem wear

- If the valve stem is worn down to the limit, as measured with a micrometer, where the clearance is found to be in excess of the limit indicated, replace the valve; if the stem is within the limit, then replace the guide.
- Measure OD of Valve Stem sliding portion at total 6 points; upper, middle and lower positions and X- and Y-directions, by means of micrometer.

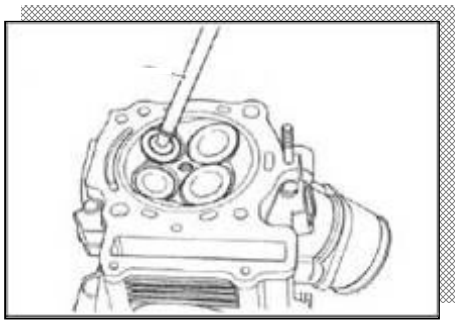
Service Limit of Valve Guide OD	
IN	5.450 - 5.465 mm
EX	5.430 - 5.445 mm

Micrometer (0 – 25 mm)

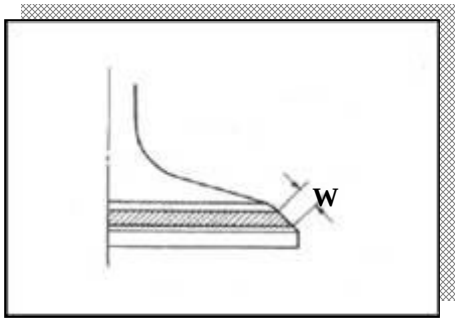
Valve Guide Attachment

Valve Guide Attachment Height	
IN	12.7 mm
EX	12.5 mm

Valve Seat Width



- Coat the valve seat uniformly with bright color. Fit the valve and tap the coated seat with the valve face in a rotating manner, in order to obtain a clear impression of the seating contact. In this operation, use the valve lapper to hold the valve head.
- The ring like dye impression left on the valve face must be continuous without any break. In addition, the width of the dye ring, which is visualized seat “width”, must fit the specification.

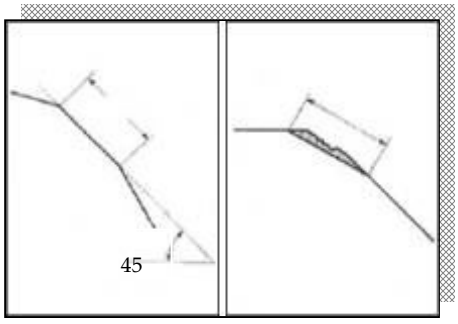


Valve Seat Width	
Standard	0.9 mm – 1.1 mm

Valve Lapper Set

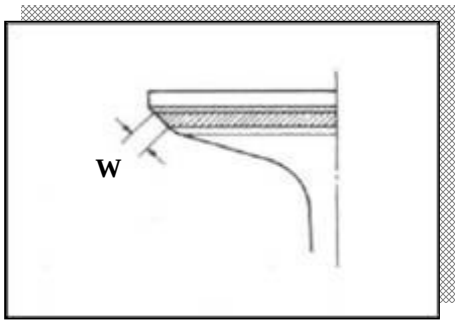
Initial Seat Cut

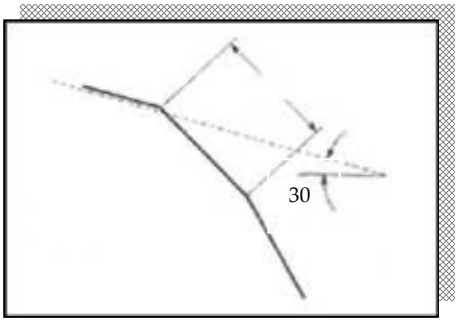
- Using the 45° cutter, descale and clean up the seat with one or two turns
- Inspection the seat (see Valve Seat Width). If the seat is pitted or burned, additional seat conditioning with the 45° cutter is required.



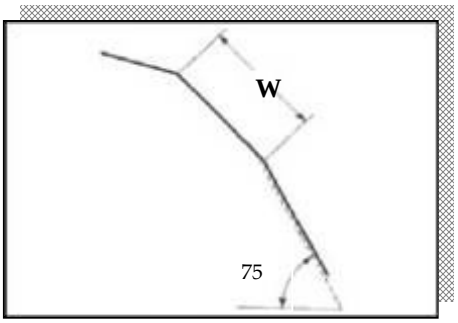
NOTE
Cut only the minimum amount necessary from the seat to prevent the possibility of the tappet shim replacement.

- If the contact area is too high on the valve, or if it is too wide, use the 30°/60° cutters to lower and narrow the contact area.

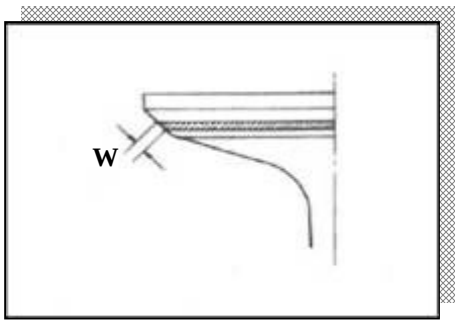




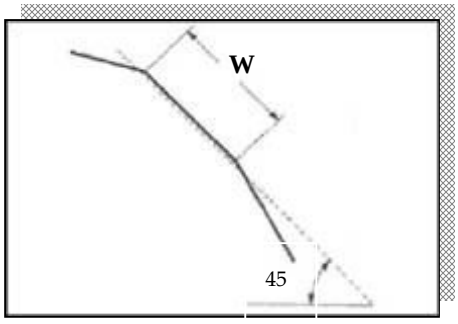
- If the contact area is too wide or too low, use the 75° cutter to narrow and raise the contact area.



- If the contact area is too low or too narrow, use the 45° cutter to raise and widen the contact area.



NOTE
After cutting the 30° and 75° angles, it is possible that the valve seat (45°) is less than the correct width.



● After the desired seat position and width is achieved, use the 45° cutter slightly to clean up any burrs caused by the previous cutting operation.

CAUTION
Do not use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish but not a highly polished or shiny finish. This will provide a soft surface for the final seating of the valve which will occur during the first few seconds of engine operation.

● Clean and assemble the head and valve components. Use the vacuum pump gauge to cover intake and exhaust ports and check for leaks. If any leaks occur, inspect the valve seat and face for burrs or other things that could prevent the valve from sealing.

NOTE
After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled.

D004-Vacuum Pump Gauge

Valve Spring

● Measure the free length of Valve Spring.

● Check the force required to compress the spring.

● If the result is not correct, replace the spring.

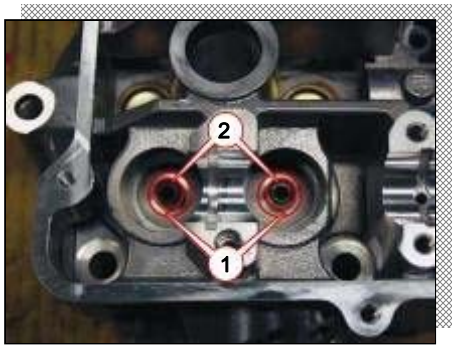
Service Limit of Valve spring free length	
IN & EX	48.0 mm

Service Limit of Valve spring free length	
IN & EX	19.0~21.4 kgf / 36.50mm

Vernier Calipers

Valve Reassembly

- Install the valve spring seats [1].
- Apply MOLYBDENUM OIL SOLUTION to each oil seal [2], and put them in their position.

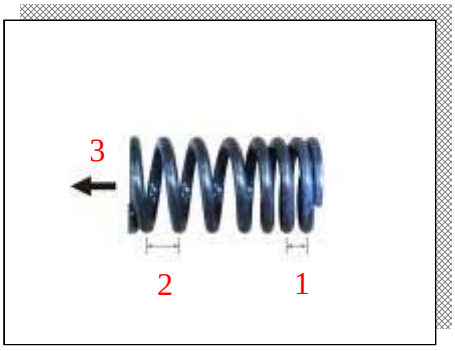


CAUTION
Do not reuse the removed oil seals.

- Insert the valves, with MOLYBDENUM OIL SOLUTION to their stems without any break.

CAUTION
When inserting each valve, take care not to damage the lip of the oil seal.

- Install the valve spring with the small-pitch portion [1] facing cylinder head.
  [2] Large-pitch portion
  [3] Upward



- Install the valve spring and spring retainer with special tool.

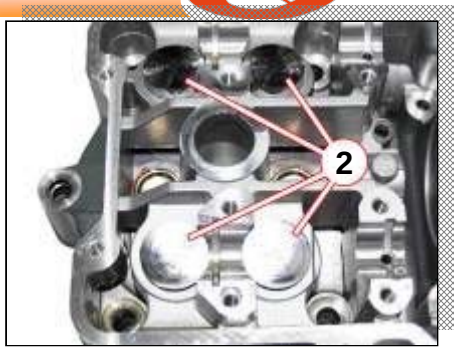
CAUTION
Be sure to restore each spring and valve to their original positions.

D005_01-Valve Lifter Attachment

D005_02-Valve Lifter

- Install the tappets [1] and shims [2] to their original position.

NOTE
Apply engine oil to the shim and tappet before fitting them. When seating the shim, be sure the figure printed surface faces the tappet.



Valve Clearance Adjustment

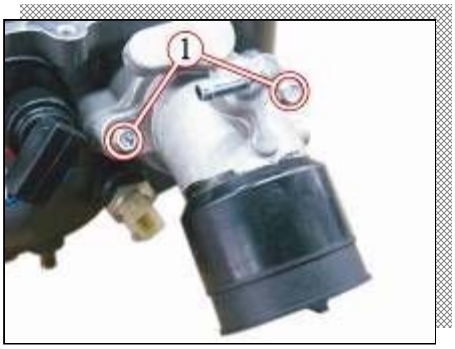
- Measure the clearance between the valve and the camshaft.
- If the value is not correct, use the tappets [1] to adjust the valve clearance.

Valve Clearance	
IN	0.1 – 0.2 mm
EX	0.2 – 0.3 mm

Thickness Gauge

Intake Pipe

- Remove the intake pipe [1].



- Apply GREASE to the O-ring.

CAUTION
Use the new O-ring to prevent air from sucking through joint.

● Apply THREAD LOCK to the intake pipe bolts.

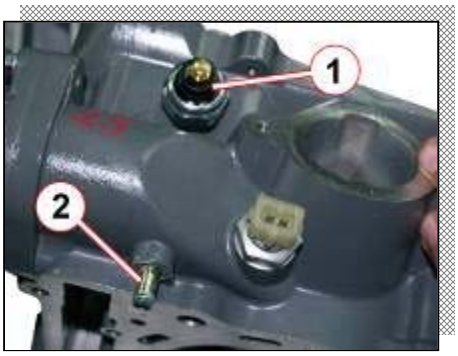
Water Bypass Union and Oil Pressure Gauge

● Remove the oil pressure gauge [1] and water bypass union [2]

● Apply THREAD LOCK to the oil pressure gauge.

● Apply THREAD LOCK to the thread part of water bypass union and tighten it to the specified torque.

Tightening Torque: 14 N-m (1.4 kgf-m, 10.0 lb-ft)



Thermostat

● Remove the thermostat cover [1].

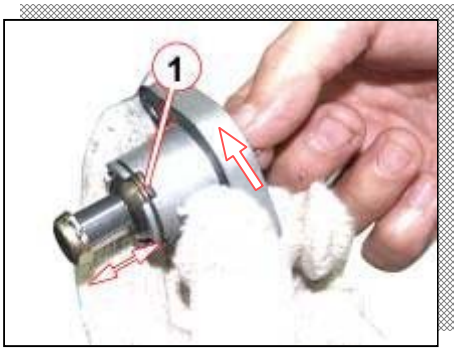
● Remove the thermostat.

Cam Chain Tensioner

Inspection

● Rotates the stopper in clockwise and check if the push rod [1] slides smoothly when releasing stopper

● If it does not slide smoothly, replace the cam chain tensioner with a new one.



Cam Chain Guide

Inspection

- Check the contacting surface of the cam chain guide for wear and damage.
- If it is found to be damaged, replace it with a new one.

Cylinder

Cylinder distortion

Check the gasketed surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated.

If the largest reading at every position of the straightedge exceeds the limit, replace the cylinder.

Cylinder Distortion	
Service Limit	0.05 mm

Thickness Gauge

Recognize Cylinder

- Different color on the cover of outside cylinder water pipe .
  Yellow means "A" level ; Pink means "B" level.
- A Piston has to be matched with A cylinder ;
  B Piston has to be matched with B cylinder .

Cylinder bore

- Check for damage or wear on bore surface.
- Measure the cylinder bore at total 6 positions; top, middle and bottom positions and perpendicular to each other.

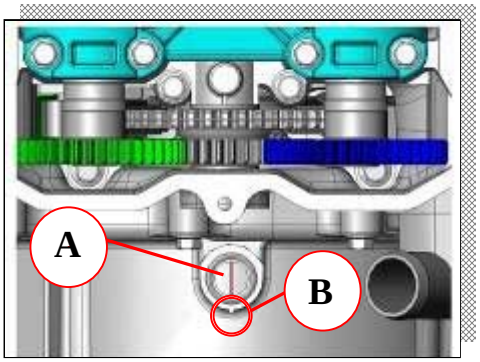
Cylinder bore	
Service limit	102.000 - 102.020mm

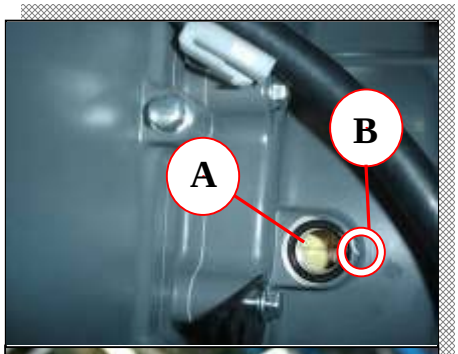
Cylinder Gauge Set

Timing Gear

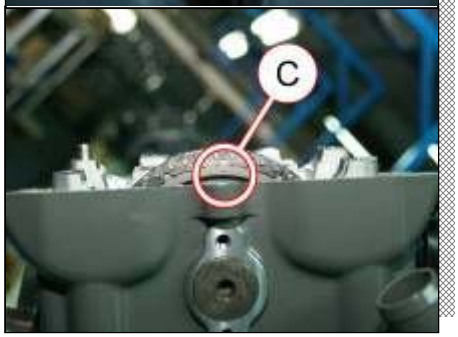
Timing gear adjust

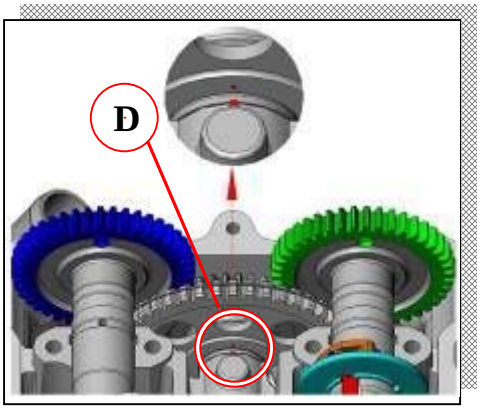
- Remove the Cylinder head cover and camshaft.
- Remove the Recoil starter.
- Leave the Starter cup on the left crankcase.
- Use tool to adjust the Start cup to align the TDC line [A] with the index mark [B] of the crankcase to make the piston to the highest position.

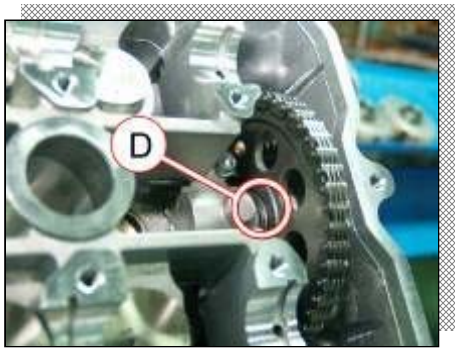




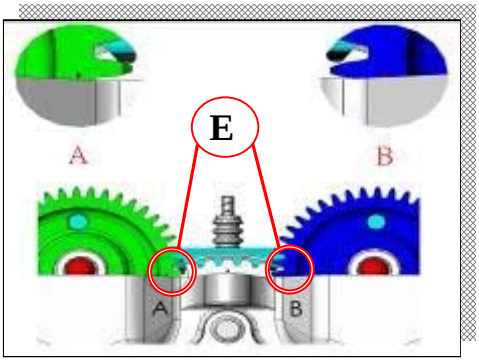
- Make the mark [C] on the Timing chain driver gear to the highest position. Meanwhile the mark on the opposite side the Timing chain driver gear is also aligned with the mark position [D].

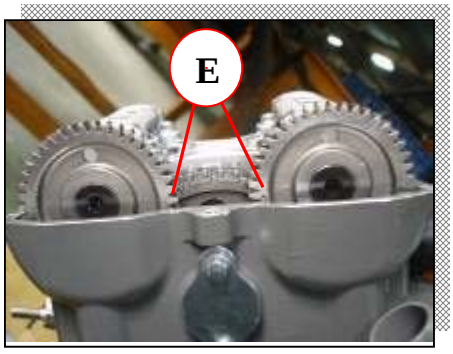






- Assemble the camshafts by aligning the engraved marks [E] with the mating surface of the cylinder head cover.





Piston

Piston Diameter

- Check for wear and damage on the sliding surface.
- Measure OD of Piston at the position shown in the picture. If the measurement is less than the limit, replace the piston.

Piston OD	
Service limit	101.880 mm

Micrometer (100 – 125 mm)

Recognize Piston

- The top of piston was printed "A" and "B".
- A Piston has to be matched with A cylinder ;
  B Piston has to be matched with B cylinder .

Piston Rings

Clearance between Piston Ring and groove

- Measure the clearance between Piston Ring and groove, by holding the Ring upwards in the groove, with thickness gauge.
- If any of the clearances exceeds the limit, replace both piston and piston rings.

Service Limit of clearance	
First	0.180 mm
Second	0.150 mm

Piton ring groove width		
Standard	First	1.21 - 1.23 mm
	Second	1.21 - 1.23 mm
	Oil	2.01 - 2.03 mm

Piton ring thickness		
Standard	First	1.17 - 1.19 mm
	Second	1.17 - 1.19 mm

Thickness Gauge

Micrometer (0 – 25 mm)

Piston Ring Free End Gap and Piston Ring End Gap

● Measure the Piston Ring free end gap with a thickness gauge.

Service Limit of Piston Ring free end gap	
First ring	10.1 mm
Second ring	8.7 mm

Vernier Calipers

● Insert Piston Ring into the lower portion of Cylinder horizontally by using Piston.

● Measure the Piston Ring free end gap by using a thickness gauge.

Service Limit of Piston Ring end gap	
Top ring	0.50 mm
Second ring	0.50 mm

Thickness Gauge

Piston pin and pin bore

ID of Piston hole for Pin

● Clean Piston hole for Pin.

● Measure ID in the up and down direction and the right angle direction with dial caliper gauge.

ID of Piston hole for Pin	
Service limit	23.030 mm

Dial Gauge (1/1000 mm, 1mm)

Small Bore Gauge (18 – 35 mm)

Piston Pin OD

● Check for wear and damage on the sliding surface.

● Measure OD at total 3 positions; both ends and middle position in the X- and Y-direction.

Piston Pin OD	
Service limit	22.980 mm

Micrometer (0 – 25 mm)

Connecting Rod

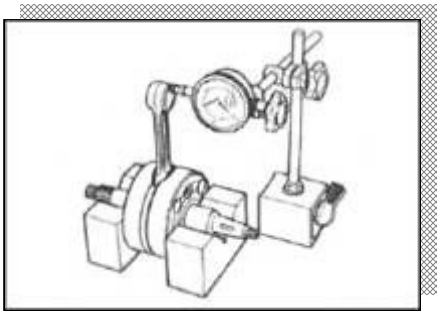
Small end ID

- Check for wear and damage on the sliding surface.
- Measure ID in the X- and Y-direction with caliper dial gauge.

Small end ID	
Service limit	23.035 mm

Dial Calipers (10 – 34 mm)

Connecting rod deflection



- Wear of the big end of the rod can be estimated by checking the movement of the small end of the rod.
- This method can also check the extent of wear on the rod's big end.

Connecting Rod deflection	
Service Limit	0.3 mm

Magnetic Stand

Dial Gauge (1/100 mm)

V-block Set (100 mm)

Side-clearance at large end of Connecting Rod

- Measure the side-clearance at large end of Connecting Rod with thickness gauge.

Side-clearance at large end	
Service Limit	1.0 mm

Thickness Gauge

Crankshaft Runout

- Set on the V-block and measure runout with dial gauge.

Crankshaft Runout	
Service Limit	0.08 mm

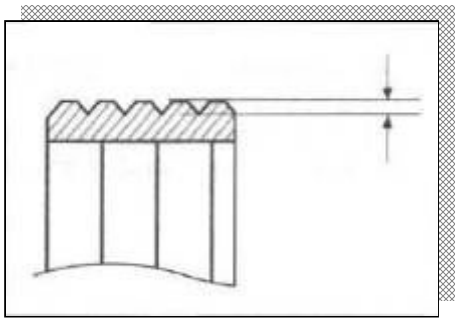
Dial Gauge (1/100 mm)

Magnetic Stand

V-block Set (100 mm)

Clutch

Clutch Shoe



- Inspect the clutch shoe for chips, cracks, uneven wear, and heat discoloration. Also, check the depth of the grooves on the clutch shoe.
- If there is no groove at any part of the shoe, replace the shoe as a set.

NOTE
The clutch shoe must always be changed as a set.

Clutch Wheel

- Inspect the condition of the inner clutch wheel surface for scuffs, scratches, cracks or uneven wear.
- If any damages are found, replace the clutch wheel with a new one.

Starter Clutch

- Remove the starter clutch securing bolts.

- Install the starter clutch in the proper direction.

NOTE
○ When installing the one way clutch assy onto the rotor, make sure the arrow mark side [1] of the one way clutch is fit the outer ring groove [2] and faces to the rotor.

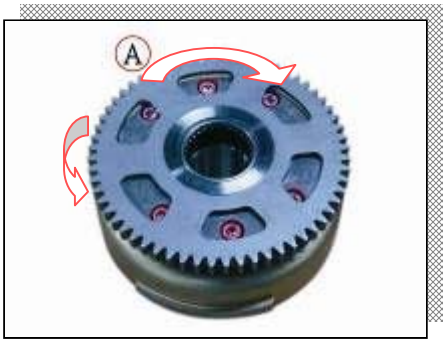
- Apply the engine oil to the starter clutch.

CAUTION
If the ball bearing has fall out of the one way clutch, replace the one way clutch for new one.

- Apply THREAD LOCK to the bolts.
- Tighten the starter clutch bolts to the specified torque.

  Tightening Torque : 26 N-m (2.6 kgf-m, 19.0 lb-ft)

- Install the starter driven gear to the starter clutch.
- Check that the starter driven gear is in the opposite direction of the arrow mark [A] on the rotor while holding the generator motor. The gear never turns in the direction of the arrow.
- If there is anything unusual, replace the one way clutch.



- Check the starter driven gear bearing, If there is anything unusual, replacing the bearing.
- Remove the bearing with the special tool.

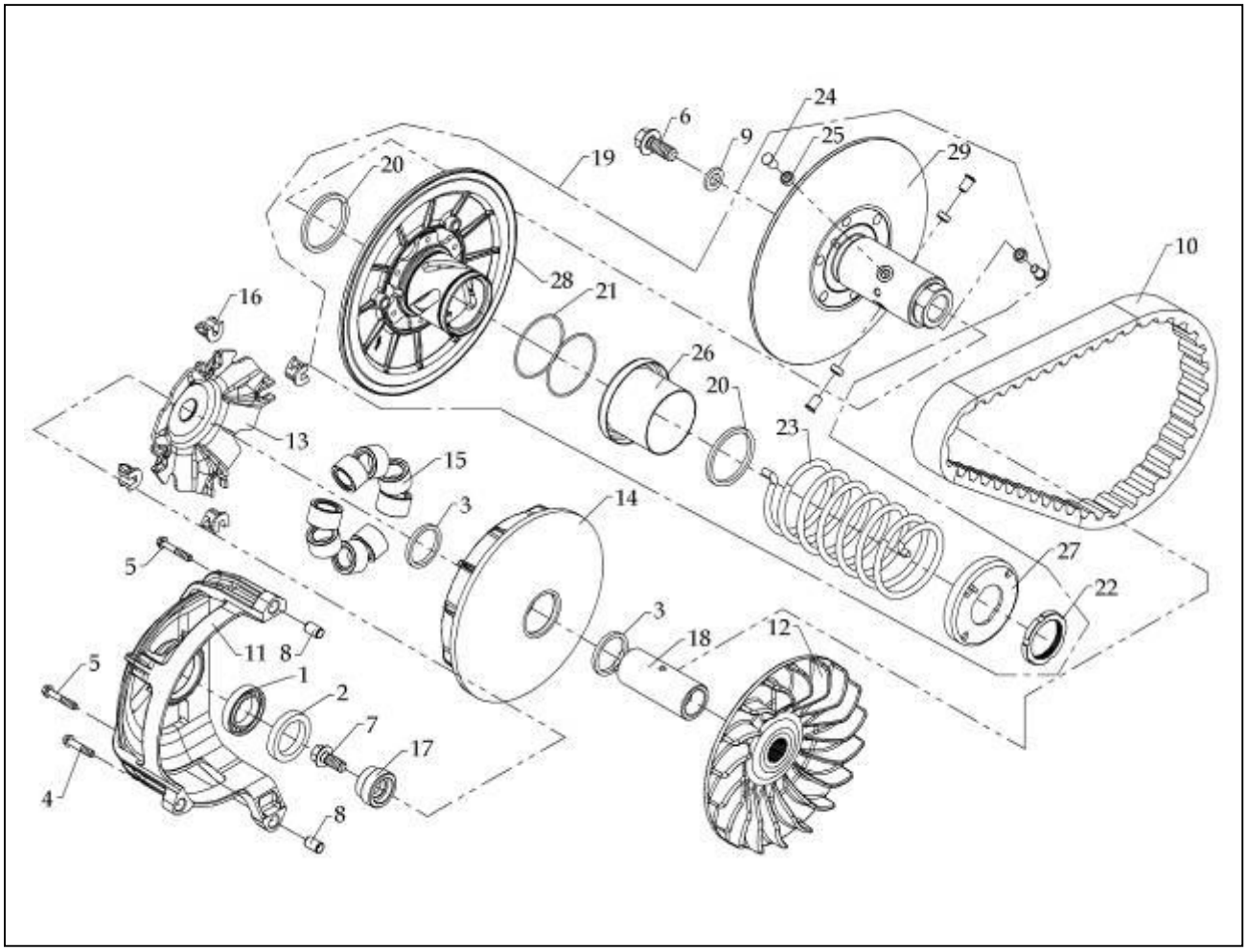
- Install the bearing with the special tool.

Oil Gallery Copper Plug

- Inspect the copper plug and its O-ring. If any damages has found in the O-ring, replace it with a new one.

CAUTION
If the O-ring does not changed even if the damages are found, the oil pressure will be too low to run, and may turns on the oil pressure indicator.

Movable Drive Face and Driven Face



1	Deep-groove ball bearing	11	Housing	21	O-ring(2pcs)
2	Oil seal	12	Fixed drive face	22	Nut
3	Oil seal(2pcs)	13	Movable drive plate	23	Spring
4	Hexagonal flange bolt	14	Movable drive face	24	Pin(4pcs)
5	Hexagonal flange bolt	15	Roller set(8pcs)	25	Ring(4pcs)
6	Hexagonal flange bolt	16	Slide piece(4pcs)	26	Movable driven sheet
7	Hexagonal flange bolt	17	Bushing	27	Movable driven holder
8	Dowel pin(2pcs)	18	Movable drive spacer	28	Movable driven face
9	Spacer	19	Gearshift shaft assy	29	Fixed driven face
10	Drive belt	20	Oil seal(2pcs)		

ITEM	N-m	kgf-m	lb-ft
6	110	11	79.5
7	85	8.5	62.0
22	100	10	72.5

Movable drive face disassembly

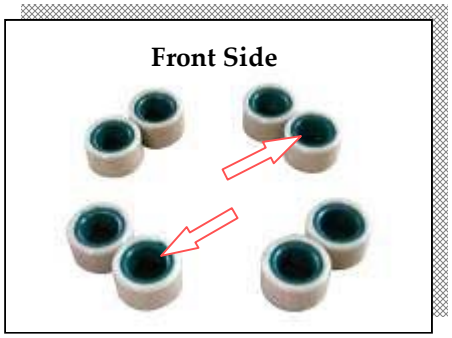
● Remove the spacer.

● Remove the movable drive face plate [1] and rollers [2].

Roller and sliding surface

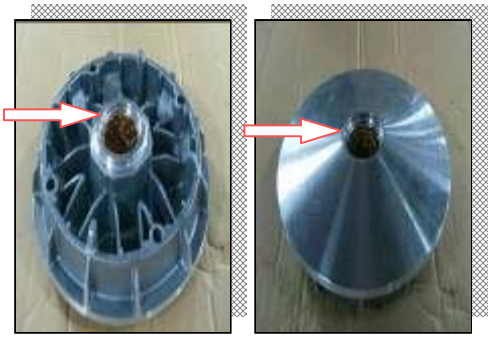
● Inspect each roller and their sliding surface for wear or damage. If any damages are found, replace the rollers as a set.

NOTE
The rollers must always be changed as a set.



Oil seal

● Inspect the lip of the oil seal for wear or damage. If any damages are found, replace the oil seal with a new one.



● Remove the oil seal.

Movable and fixed drive face

● Inspect each drive faces for any abnormal conditions such as stepped wear or discoloration caused by burning. If any damages are found, replace the drive faces with new ones.

● Install the oil seal with the special tool.

Reassembly

● Reassemble the movable and fixed drive face in the reverse order of disassembly.

● Apply a small amount of GREASE to the bore and oil seal lip.

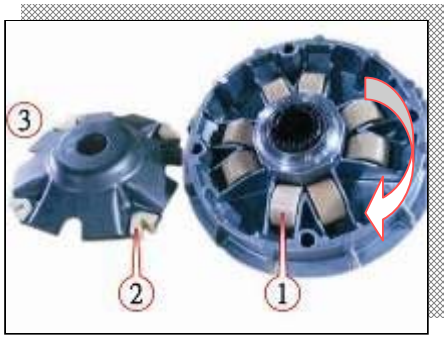
CAUTION
○ Wipe off any excess grease thoroughly. ○ Take care not to apply grease to the contact surface of the drive belt.

● Position the eight rollers [1] on the movable drive face.

● Mount on the dampers [2] on the movable drive face plate.

● Position the movable drive face plate [3] on the movable drive face.

NOTE
When installing the roller set, make sure the roller's front side is faces to the right, in clockwise direction.



● Install the spacer.

NOTE
When inserting the spacer, press down the movable drive face plate so as not to cause the rollers to come out of position.

Movable driven face disassembly

● Hold the movable driven face assembly with the special tool, loosen the movable driven face ring nut with the special tools.

⚠WARNING
Do not remove the movable driven face ring nut before attaching the clutch spring compressor.

Ring Nut Socket Wrench

● Attach the special tool to the movable driven face assembly and compress the movable driven face assembly by turning in the special tool handle.

NOTE
Make sure to insert the flange of the special tool into the spring plate hole.

● Remove the movable driven face ring nut.

● Loosen the special tool handle slowly and remove the special tool.

● Remove the spring plate [1] and spring [2].

● Remove the spring seat [3].

● Remove the pins and rollers.

● Remove the movable driven face.

O-ring and Oil seal

● Inspect the lip of the oil seal and O-ring for wear or damage. If any damages are found, replace the oil seal or O-ring with a new one.

● Remove the oil seal.

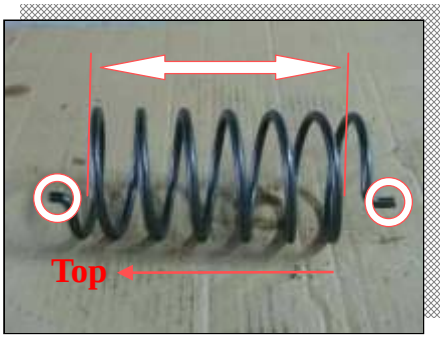
● Install the oil seal with the special tool.

Movable driven face spring

- Measure the spring free length with the vernier caliper.
- If the length is shorter than the service limit, replace the spring with a new one.

Movable driven face spring free length	
Service Limit	150.0 mm

- When installing the spring, shorter side is on the top.



Movable and fixed driven face

- Inspect the driven faces for any abnormal conditions such as stepped wear or discoloration caused by burning. If any damages are found, replace the movable driven face with a new one.

Reassembly

- Install the new O-ring.
- Apply GREASE to the oil seal lips and movable driven face inside grease groove.

- Apply GREASE to the O-rings and pin grooves.

- Install the rollers and pins.

CAUTION
To prevent damaging the oil seal lip from during installation, slide the lip using a 0.1 mm steel sheet as a guide.

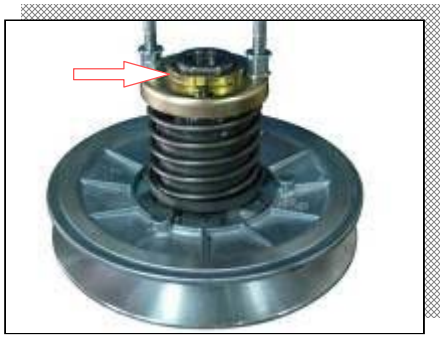
● Install the spring seat by aligning the holes.

● Install the spring and the spring plate by aligning the spring ends with the holes.

● Compress the spring with the special tool.

● Tighten the movable driven face ring nut temporarily.

● Remove the special tool from the movable driven face assembly.



● Tighten the movable driven face ring nut to the specified torque with the special tool.

Tightening Torque: 100 N-m (10.0 kgf-m, 72.0 lb-ft)

Ring Nut Socket Wrench

Drive Belt

Inspection

- Check that the drive belt is free from any greasy substance.
- Inspect the contact surface of the drive belt for cracks or damage and measure the width of the drive belt using the vernier caliper.
- If any damages are found or the measurement exceeds the service limit, replace the drive belt with a new one.

Drive belt width	
Service Limit	33.3 mm

CAUTION
If grease or oil is present on the surface of the drive belt, degrease the belt thoroughly.

Vernier Calipers

Oil Pump

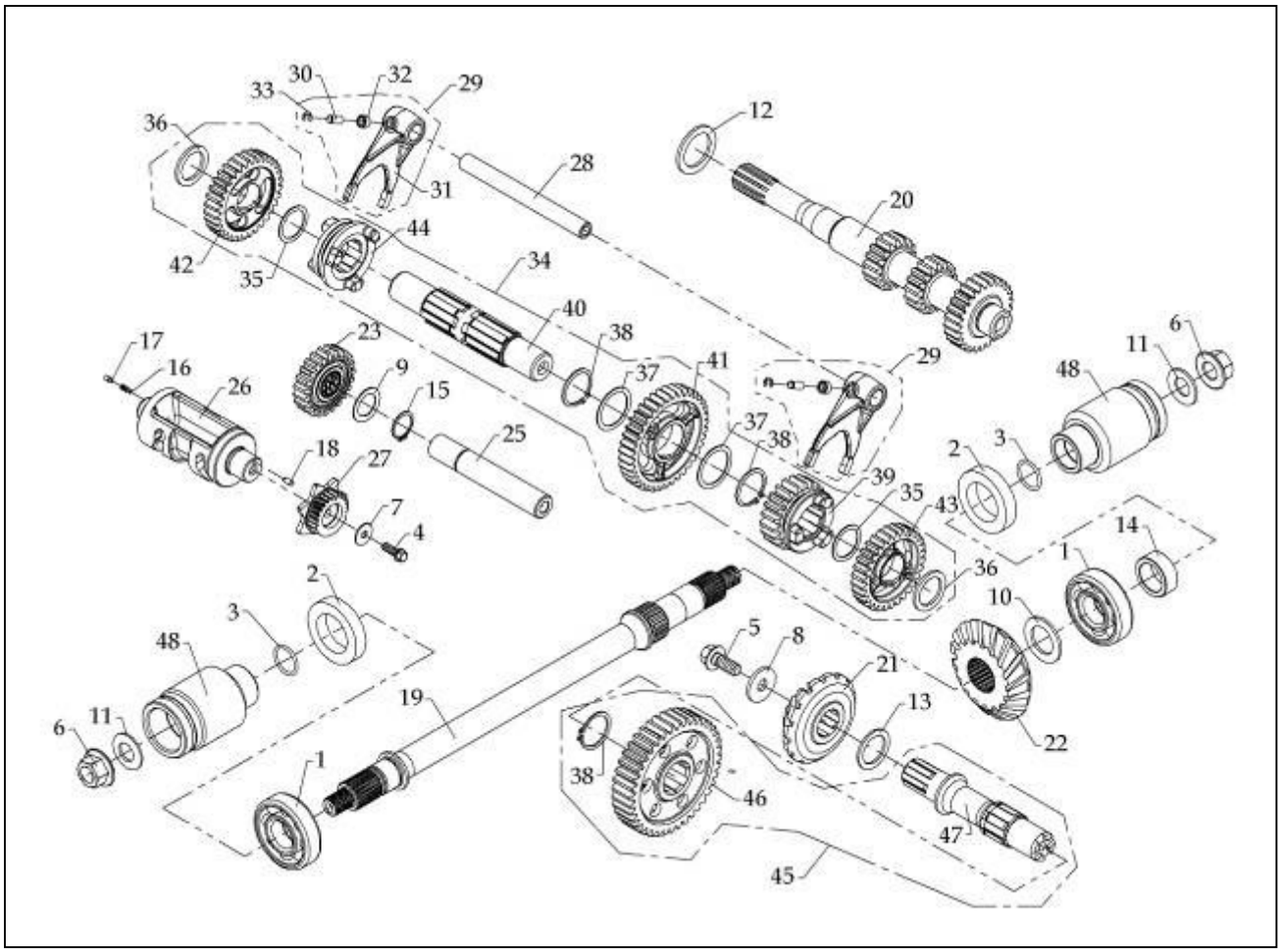
- Rotate the oil pump by hand and check that it moves smoothly.
- If it does not move smoothly, replace the oil pump assembly.

CAUTION
○ Do not attempt to disassembly the oil pump assembly. ○ The oil pump is available only as an assembly.

Transmission

Disassembly

● Disassemble the transmission as shown.



01	ball bearing(2pcs)	13	Spacer	25	Reverse shaft	37	Spacer(2pcs)
02	Oil seal(2pcs)	14	Spacer	26	Cam drum	38	C-type circlip(3pcs)
03	O-ring(2pcs)	15	C-type circlip	27	Gearshift stopper	39	Counter gear
04	Hexagonal bolt	16	Spring	28	Shaft fork	40	Counter shaft
05	Hex washer bolt	17	Indicator switch	29	Fork	41	Low driven gear
06	Flange hex nut	18	Dowel pin	30	Pin(2pcs)	42	Reverse driven gear
07	Spacer	19	Output shaft	31	Fork(2pcs)	43	High T/M gear
08	Plain washer	20	Main input shaft	32	Ring(2pcs)	44	Clutch
09	Spacer	21	Drive bevel gear	33	Retaining rings	45	Final shaft(T/M assy)
10	Spacer	22	Output bevel gear	34	Countershaft assy	46	Final T/M gear
11	Spring washer	23	Seminal	35	Spacer(2pcs)	47	Final T/M shaft
12	Spacer	24	Bush bearing	36	Spacer(2pcs)	48	Output connector

Reassembly

● Assemble the transmission gear in the reverse order of disassembly. Pay attention to the following points:

NOTE
Always use new snap rings.

NOTE
Before installing the gears, coat lightly engine oil to the transmission input/output shaft.

CAUTION
○ Never reuse a snap ring. After a snap ring has been removed from a shaft, it should be discarded and a new snap ring must be installed. ○ When installing a new snap ring, do not expand the end gap larger than required to slip the snap ring over the shaft. ○ After installing a snap ring, make sure that it is completely seated in its groove and securely fitted.

● Install the snap ring onto the transmission output shaft and position it so it fits into the groove.

NOTE
Make sure that the snap ring is positioned properly.

Gearshift Fork

Visual checking – Shift Fork and Drum

- Check for ware and damage.
- If any wear on the Fork craw portion, replace with new one.

Visual checking – Main Shaft and Counter Shaft Assy.

- After disassembling, check for wear and damage on dig clutch portion, gears and spline portions.
- If any wear and damage had found, replace with new one.

Gearshift Fork-To-Groove Clearance

- Measure the gear fork-to-groove clearance by using the thickness gauge.
- If the clearance exceeds the limits, replace the fork or its gear, or both.

Shift for to groove clearance	
Standard	0.10 – 0.27 mm
Service Limit	0.50 mm

Thickness Gauge

Width of Shift Fork Groove

- Check for wear and scratch in the Fork groove.
- Measure the width of shift fork groove with vernier calipers .

Width of Shift Fork groove		
Standard	Reverse	5.60 - 5.67 mm
	High	5.60 - 5.67 mm

Vernier Calipers

Thickness of Shift Fork

- Measure the thickness of Shift Fork with micrometer.

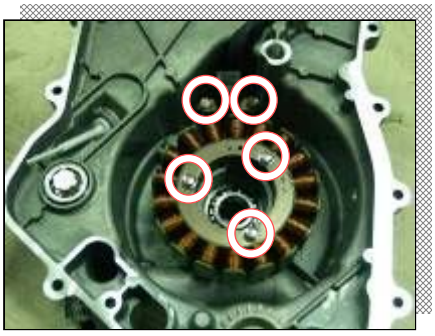
Thickness of Shift Fork		
Standard	Reverse	5.40 - 5.50 mm
	High	5.40 - 5.50 mm

Vernier Calipers

Generator Cover

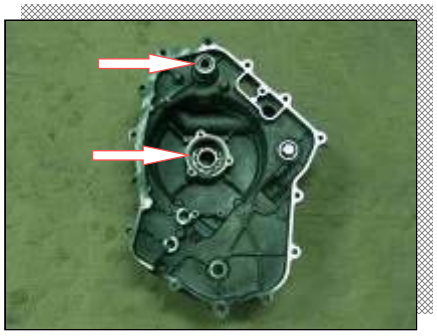
Disassembly

● Remove the generator stator assy.

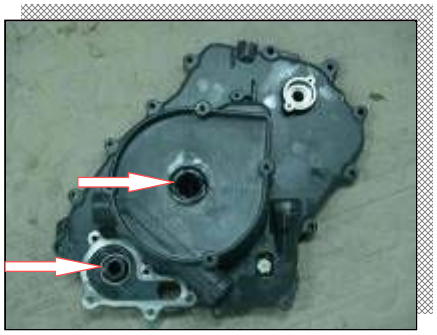


● Remove the bearings with the special tool.

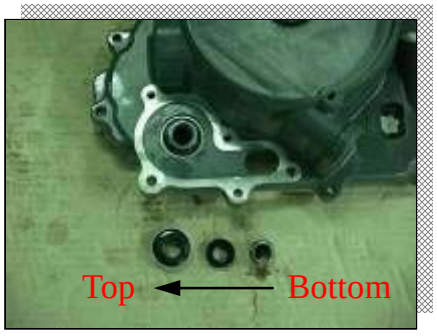
NOTE
If there is no abnormal noise, than the bearing removal is not necessary.



● Remove the oil seals.



CAUTION
○ It is necessary to put the oil seals and needle bearing in order. Follow the arrow mark to place the components to its position. ○ When installing the needle bearing, it must install from the other side, make sure that the mark side is face to the engine.

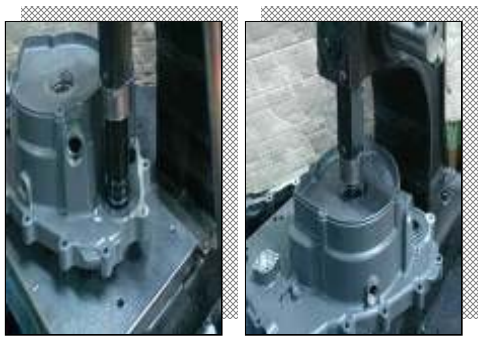


● Install the water pump and its cover.

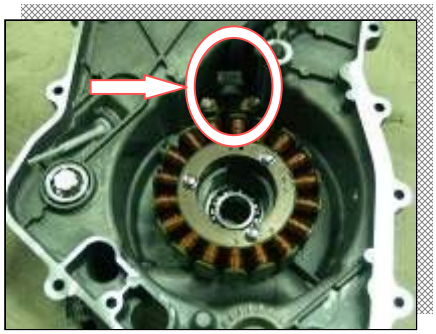
(See Water Pump Reassembly and Installation)

Reassembly

● Install the oil seals with the special tool.



- Install the bearings with the special tool.
- Install the generator stator assy.



CAUTION
The harness of the sensor must be fastened to prevent for hitting the stator.

REASSEMBLY

● Please reverse the disassembly steps to reassembly.

Pay attention to the following points:

NOTE
Apply engine oil to each running and sliding part before reassembling.

CAUTION
Always keep the drive belt, drive face and driven face away from any greasy matter.

Engine Bottom Side

● Install the crankshaft into crankcase.

CAUTION
○ Never fit the crankshaft into the crankcase by striking it with a plastic mallet.

● Install the crank balancer shafts [1].

● Install the transmission gear/shaft assembly in a certain order, main input shaft [1], output shaft [2], counter shaft [3] and reverse idle gear assembly [4].

● Install the spacer [5].

● Install the gearshift forks.

● Install the gearshift cam drum.

● Install the oil sump filter.

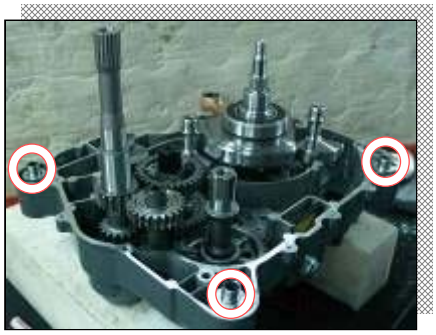
NOTE
Fit the thinner side of the oil sump filter in the bottom as shown.

● Wipe the crankcase mating surfaces (both surfaces) with a cleaning solvent.

● Fit the dowel pins onto the left half on the crankcase.

● Apply engine oil to the connecting rod big end and the gears.

● Apply BOND to the mating surface of the right crankcase.

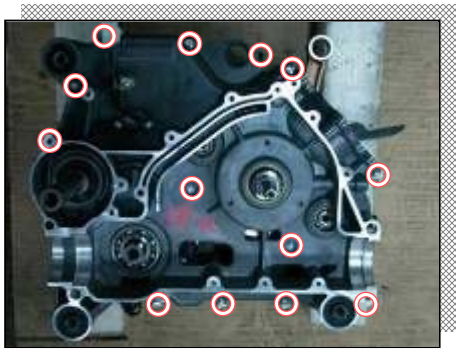


● Tighten the crankcase bolts a little at a time to equalize the pressure until the specified torque.

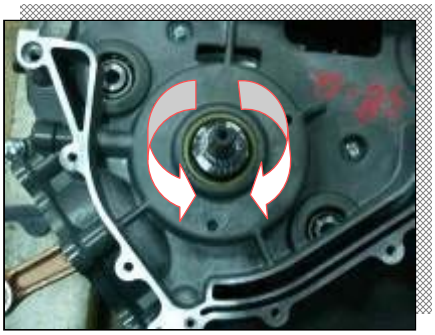
Tightening torque: **(M6) 10 N-m (1.0 kgf-m, 7.0 lb-ft)**

(M8) 26 N-m (2.6 kgf-m, 19.0 lb-ft)

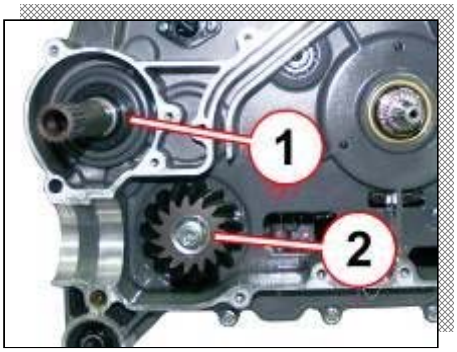
NOTE
Tighten the crankcase bolts diagonally with the bigger size first.



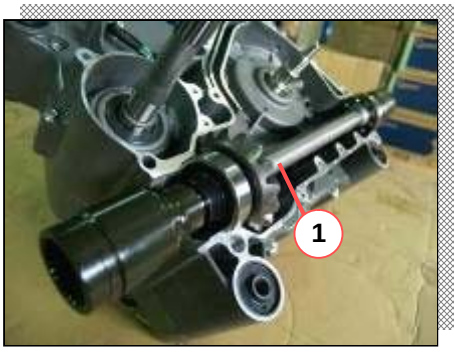
● After the crankcase bolts have been tightened, check if the each shaft rotates smoothly. If a large resistance is felt to rotation, try to free the shafts by tapping them with a plastic mallet.



● Install the collar [1] and the drive bevel gear [2].



● Install the output shaft [1].



● Apply THREAD LOCK to the clutch shoe nut.

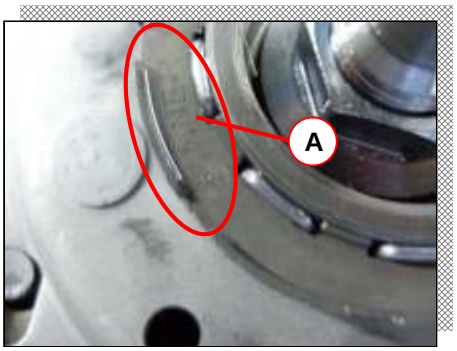
● Install the clutch shoe assembly and tighten the clutch shoe nut to the specified torque.

NOTE
The clutch shoe nut has left-hand threads.

Tightening Torque: 150 N-m (15.0 kgf-m, 108.5 lb-ft)

● Apply MOLYBDENUM OIL to the inside of the one way clutch.

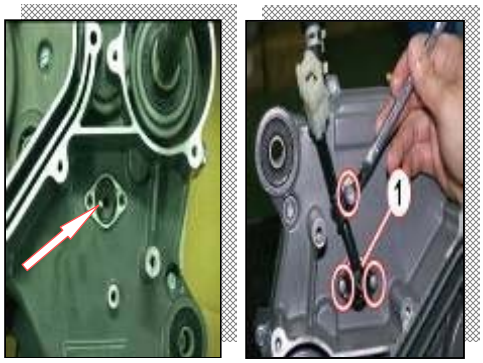
● Install the one way clutch with facing the mark [A] outside.



● Install the new gasket and the plate [1] and the CVT cover.

NOTE
Be careful about the size of the bolts (M6&M8), it is necessary to put them in the original position.

- Install the pin.
- Install the gear position indicator [1].



- Install the fixed drive face.

NOTE
Degrease the fixed drive face. Use nonflammable cleaning solvent to wipe off oily or greasy matter and make its surfaces completely dry.

- Install the drive belt, as low as possible, between the movable driven face and fixed driven face by using the special tool.

CAUTION
○ The drive belt contact surface of the driven face should be thoroughly cleaned.

Movable Driven Face Spring Compressor

- The other way is using the same size bolts, which at least 70 mm long to install the drive belt.

- Install the movable driven face assembly.

CAUTION
Pull the center area of upper and lower belt lines to be close to each other to prevent the belt from expanding.

- Tighten the movable driven face bolt to the specified torque with the special tool.

  Tightening Torque: 110 N-m (11.0 kgf-m, 79.5 lb-ft)

- Install the movable drive face assembly.

NOTE
Degrease the movable drive face assembly. Use nonflammable cleaning solvent to wipe off oily and greasy matter and make its surfaces completely dry.

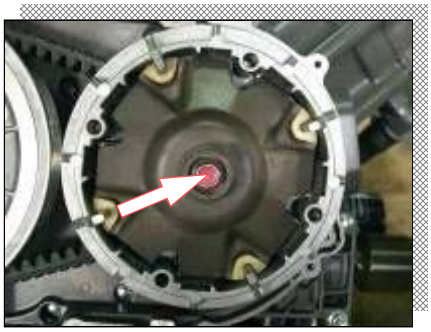
- Install the collar and movable drive face bolt.

NOTE
Be careful about the direction of the collar.

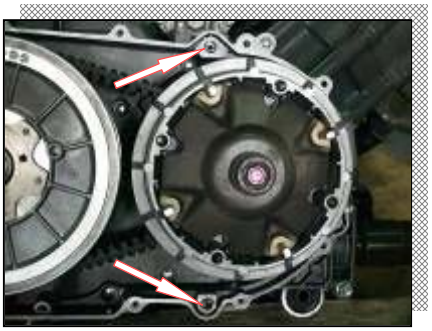
- Tighten the movable drive face bolt to the specified torque with the special tool.

  Tightening Torque: 85 N-m (8.5 kgf-m, 62.0 lb-ft)

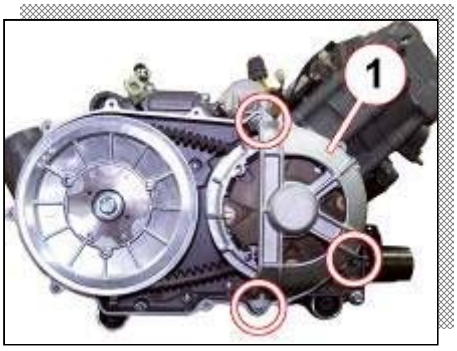
NOTE
Turn the fixed drive face until the belt is seated in and both the drive and driven faces will move together smoothly without slip.



- Install the dowel pins.



● Install the movable drive face cover [1].



● Install the new gasket and clutch cover.

● Tighten the clutch cover bolts to the specified torque.

Tightening Torque: 9 N-m (0.9 kgf-m, 6.5 lb-ft)

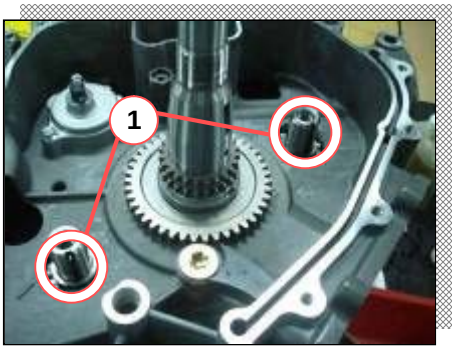
● Install the pin.

● Install the balancer shaft drive gear.

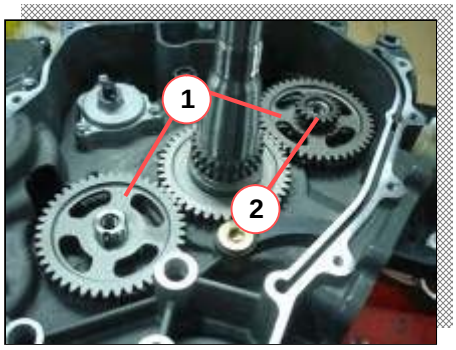
● Install the cam chain drive gear with the special tool.

CAUTION
The cam chain is installed at the lower position of the drive gear.

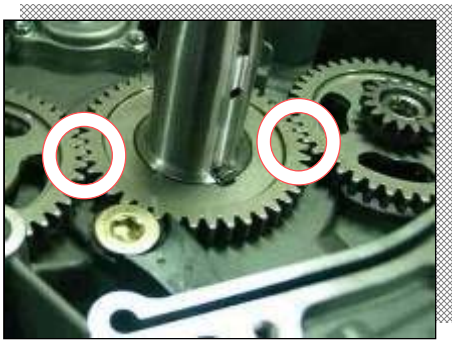
● Install the keys [1].



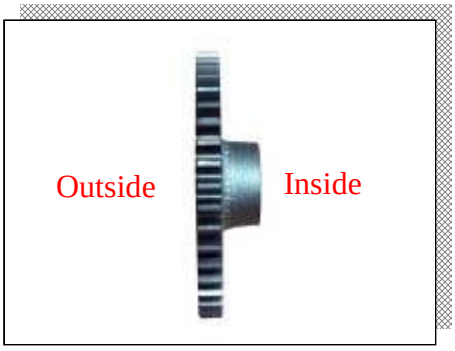
- Install the crank balancer driven gears [1] and water pump drive gear [2].



NOTE
Align the punched marks as shown.



NOTE
Pay attention to the direction of the water pump drive gear and oil pump drive gear.



- Apply THREAD LOCK to the oil pump mounting bolts.
- Install the pin [1].

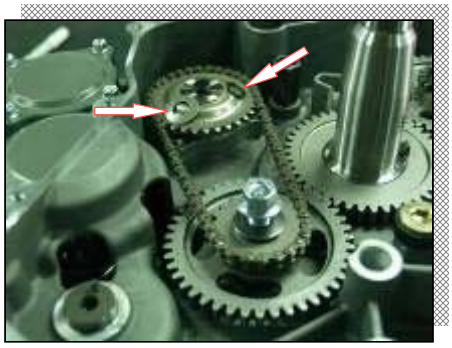
NOTE
Be careful not to drop the washer and pin into the crankcase.

- Install the oil pump drive gear [1] and oil pump driven gear with chain [2].

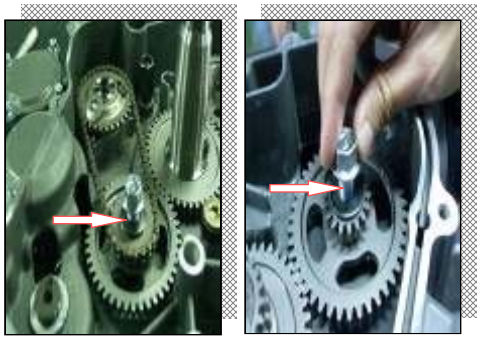
NOTE
Both gears have to be installed at the same time.

● Install the snap ring and washer.

NOTE
Be careful not to drop the snap ring into the crankcase.



● Apply THREAD LOCK to the balancer driven gear bolts.



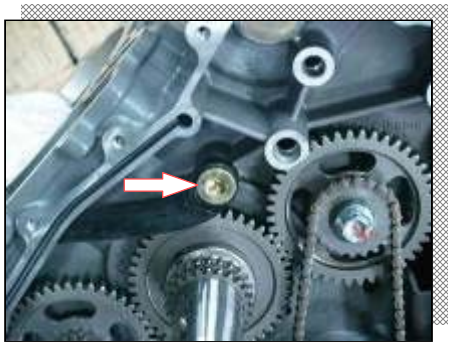
● Hold the crank balancer drive gear with the special tool and tighten the crank balancer shaft driven gear bolts to the specified torque.

Tightening Torque: 50 N-m (5.0 kgf-m, 36.0 lb-ft)

● Install the cam chain guide.

● Tighten the cam chain guide bolt to the specified torque.

Tightening Torque: 23 N-m (2.3 kgf-m, 16.5 lb-ft)



● Install the starter driven gear [1].

● Install the key [2].

NOTE
○ Degrease the tapered portion of the generator rotor assembly, and also the crankshaft. Use nonflammable cleaning solvent to wipe off the oily and greasy matter to make these surfaces completely dry. ○ Make sure the pin [A] is installed at the end of the crankshaft.

● Install the generator rotor assembly.

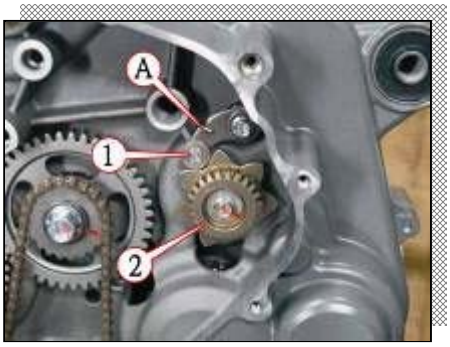
CAUTION
Make sure that the one way clutch on the crankshaft rotor is fitted into the generator rotor properly, there had to have a small amount of clearance between the rotor and the starter driven gear.

● Tighten the generator rotor nut to the specified torque.

Tightening Torque: 160 N-m (16.0 kgf-m, 115 lb-ft)

● Install the gearshift cam stopper, the stopper [1], bolts [2] and return spring [3].

● Install the gearshift cam stopper [1] and cam driven gear [2].



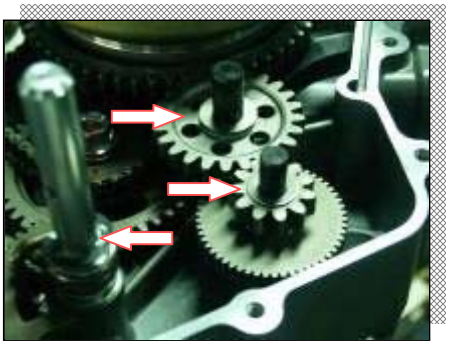
NOTE
Hook the return spring end [A] to the stopper. ○ Check the gearshift cam stopper moves smoothly. ○ Locate the gearshift cam in the neutral position.

NOTE
Align the gearshift cam pin with the cam driven gear hole.

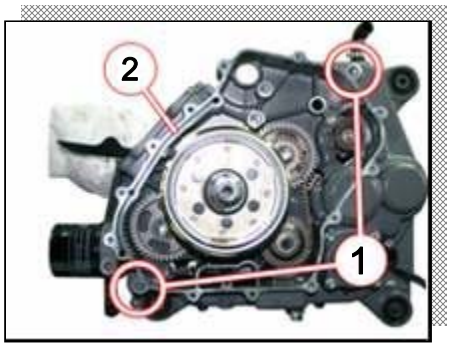
● Reassemble the gearshift shaft.

● Install the gearshift by aligning the punched mark with the center of the cam driven gear.

● Install the starter reduction gear and gearshift shaft



● Install the dowel pins [1] and new gasket [2].



● Install the copper plug and its O-ring.

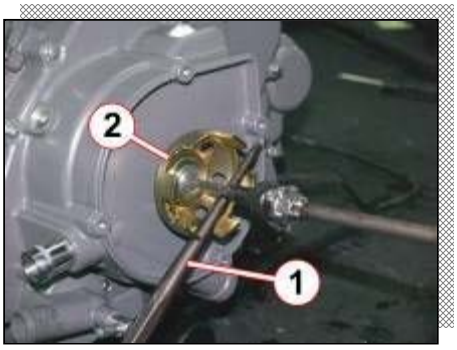
● Install the generator cover.

● Install the starter cup.

NOTE
Fit the pin to the starter cup hole.

- Use the suitable bar [1] to install the starter cup [2].
- Tighten the starter cup to the specified torque.

  Tightening Torque: 26 N-m (2.6 kgf-m, 19.0 lb-ft)



- Apply GREASE to the gasket.

CAUTION
Use the new gasket to prevent oil leakage.

- Install the water pump cover [1].

- Install the oil filter with the special tool.

D003-Oil Filter Wrench

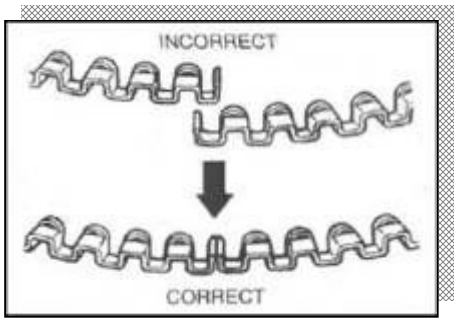
Engine Top Side

- Install the piston rings in the order of oil ring, second ring and first ring
- The first member to go into the oil ring groove is a spacer.

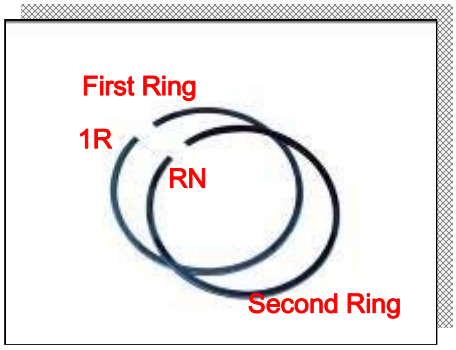
  After placing the spacer, fit the two side rails.

NOTE
Side designations, top and bottom, are not applied to the spacer and side rails. Those can be positioned each either way.

CAUTION
When installing the spacer, be careful not to allow its two ends to overlap in the groove.

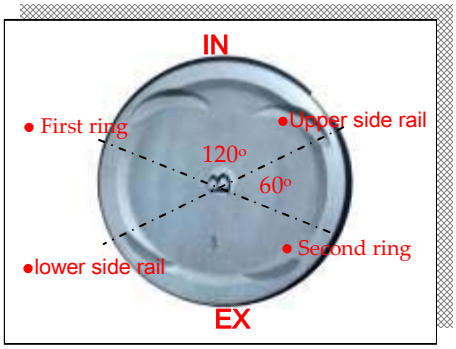


- Install the second ring and first ring.
- Second ring has letter "RN" marked on the side, and the first ring has the letter "1R" marked on the side. Be sure to bring the marked side to the top when fitting it to the piston.



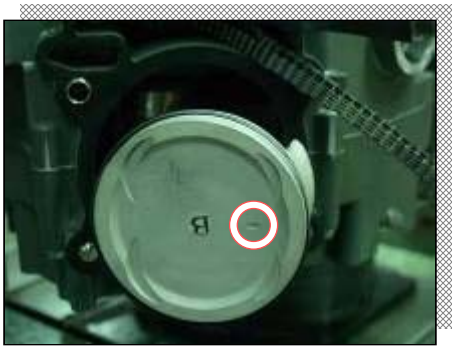
- Position the gaps of the three rings as shown. Before inserting the piston into the cylinder, check that the gaps are so located.

NOTE
The spacer can be inserted into either first ring side or the second ring side.



- Apply a small amount of MOLYBDENUM OIL SOLUTION to the piston pin
- Install the piston and piston pin.

NOTE
When installing the piston, the arrow mark on the piston head is located to the exhaust side.



- Place a clean rag over the crankcase.
- Install the circlip.

CAUTION
When turning the crankshaft, pull the cam chain upward, or the chain will be caught between the crankcase and the cam drive sprocket.

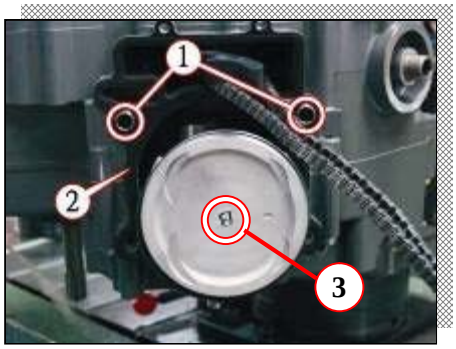
- Fit the dowel pins [1] and the new gasket [2].
- Piston [3] has to be matched with same level cylinder.

  (see 6-35 and 6-33)

  A Piston has to be matched with A cylinder ;

  B Piston has to be matched with B cylinder .

CAUTION
Use a new gasket to prevent gas leakage.

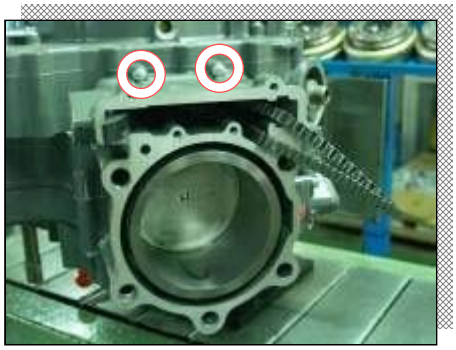


● Hold each piston ring with properly position, insert the piston into the cylinder.

Piston Ring Clip

● Tighten the cylinder base nuts.

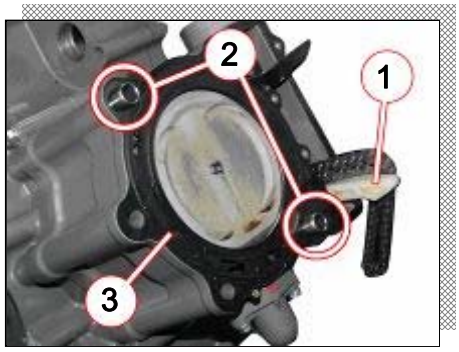
CAUTION
When installing the cylinder and cylinder head, pull the cam chain upward, or the chain will be caught between the crankcase and cam drive sprocket.



● Install the cam chain guide [1].

● Fit the dowel pins [2] and new cylinder head gasket [3].

CAUTION
Use a new gasket to prevent gas leakage.

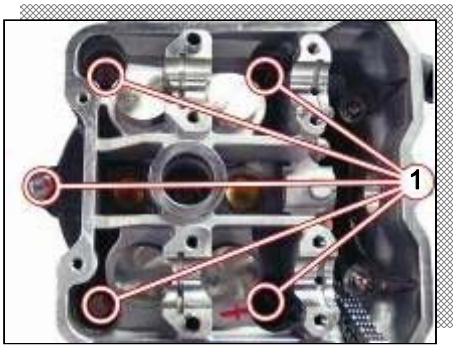


● Install the cylinder head.

● Tighten the cylinder head bolts (M10) [1] in ascending order of numbers to the specified torque.

Tightening Torque: Initial 25 N-m (2.5 kgf-m, 18.0 lb-ft)

Final 37 N-m (3.7kgf-m, 27.0 lb-ft)

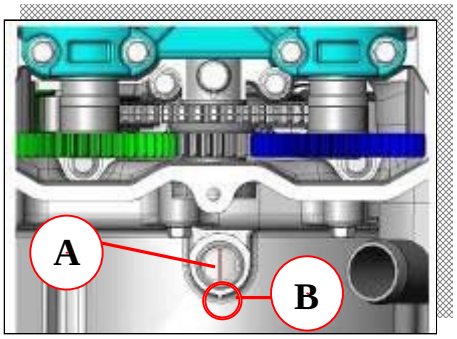


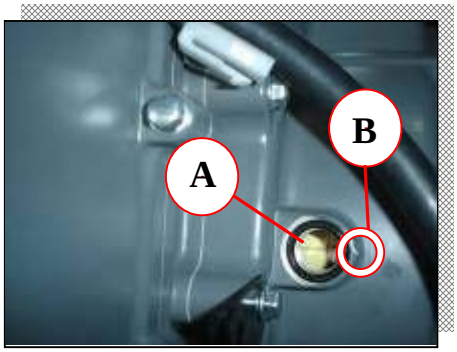
● Tighten the cylinder head bolts (M6) [2] to the specified torque.

Tightening Torque: 11 N-m (1.1 kgf-m, 8.0 lb-ft)

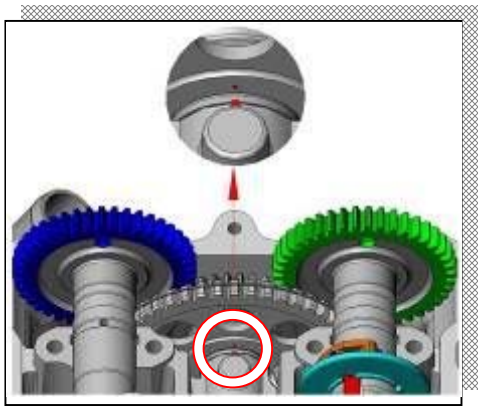
NOTE
Apply engine oil to the both side of washer and thread portion of the bolts before installing the cylinder head bolts.

- Align the line [A] on the generator rotor with the index mark [B] on the crankcase



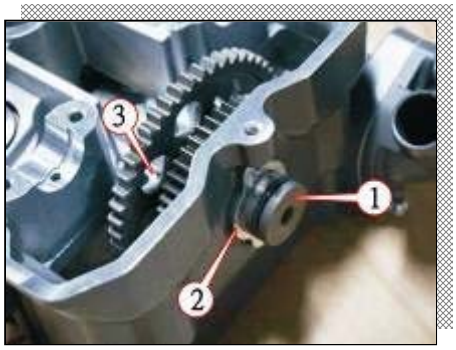


- Install the cam drive idle gear/sprocket with cam drive chain onto the cylinder head.
- Align the punched mark on the cam drive idle gear/sprocket with the embossed line on the cylinder head.

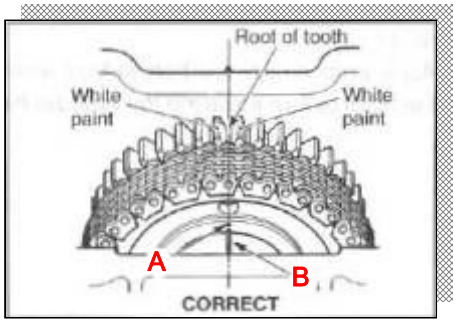


- Install the cam drive idle gear/sprocket shaft [1], copper washer [2] and shim [3].

CAUTION
When checking the positions, remove the cam chain slack at the cam chain guide side by holding the cam drive idle gear/sprocket by hand.



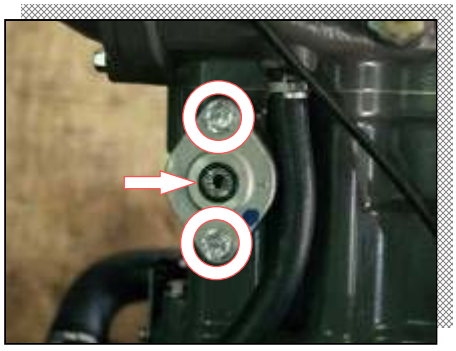
NOTE
Due to special valve train mechanism, aligning of the three elements; the punched mark, embossed line and the gear tooth root on the cam drive idle gear/sprocket; can occur once every other rotation of crankshaft.



CAUTION
If the punched mark [A] does not align the embossed line [B], turn the crankshaft 360° (1 turn) to bring the line on the generator rotor to the index mark on the crankcase again and reinstall the cam drive idle gear/sprocket to the correct position as shown.

- Tighten the cam drive idle gear/sprocket shaft to the specified torque.

  Tightening Torque: 41 N-m (4.1 kgf-m, 29.5 lb-ft)



- Install the cam chain tensioner and tighten the mounting bolts to the specified torque.

  Tightening Torque: 10 N-m (1.0 kgf-m, 7.0 lb-ft)

- Install the new O-ring.

CAUTION
Use the new O-ring to prevent oil leakage.

- Install the cam chain tensioner cap bolt.

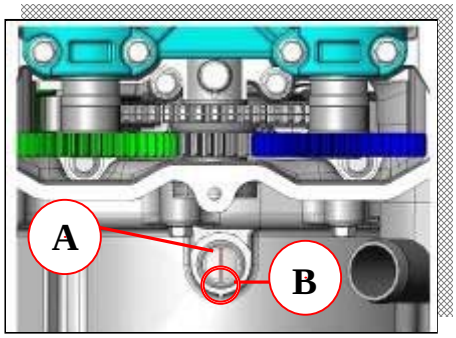
NOTE
Click sound is heard when the cam chain tensioner cap bolt is installed.

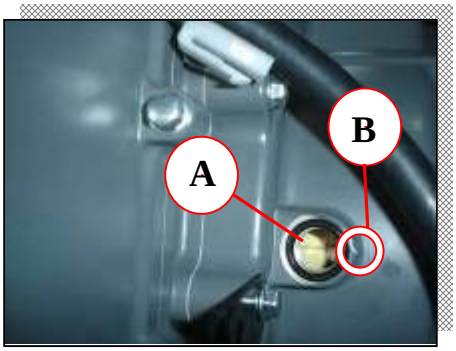
- Tighten the cam chain tensioner cap bolt to the specified torque.

  Tightening Torque: 7 N-m (0.7 kgf-m, 5.0 lb-ft)

CAUTION
After installing the cam chain tensioner, check to be sure that the adjuster works properly by checking the slack of cam chain.

● Align the line [A] on the starter clutch with the index mark [B] on the crankcase.



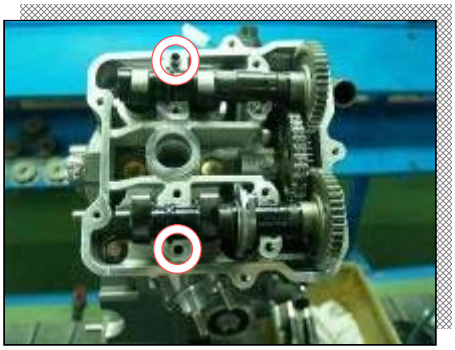


● Install the dowel pins.

● The camshaft are identified by the engraved letters.

● Before replacing the camshafts on cylinder head, apply MOLYBDENUM OIL SOLUTION to their journals and cam faces.

● Apply MOLYBDENUM OIL SOLUTION to the camshaft journal holders.

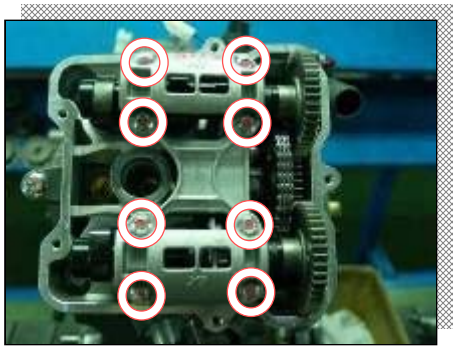


NOTE
Before installing the camshaft, check that the tappets are installed correctly.

● Tighten the camshaft journal holder bolts to the specified torque.

Tightening Torque: 10 N-m (1.0 kgf-m, 7.0 lb-ft)

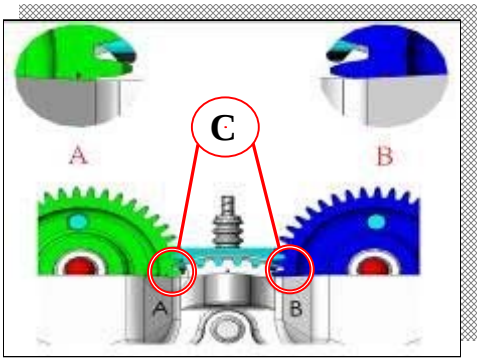
● Measure the valve clearance again to prevent incorrect value.

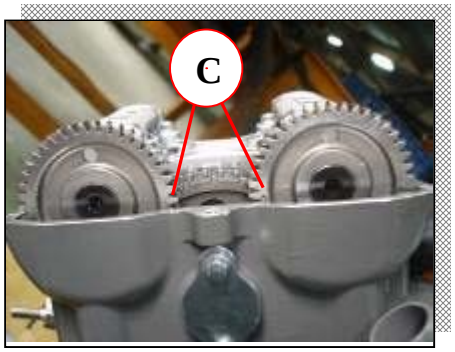


● Align the engraved lines [C] on the camshaft so it is parallel with the mating surface of the cylinder head cover.

● Check the valve clearance.

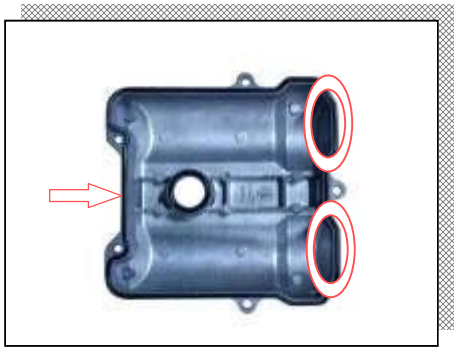
● Pour engine oil in each oil pocket in the cylinder head.





● Install the new gasket to the cylinder head cover.

●Apply BOND to the cam end caps of the gasket as shown.



CAUTION
Use the new gasket to prevent oil leakage.

● Tighten the head cover bolts to the specified two-step torque sequentially.

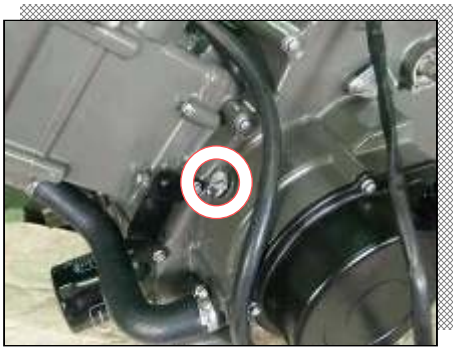
Tightening Torque: Initial 10 N-m (1.0 kgf-m, 7.0 lb-ft)

Final 14 N-m (1.4 kgf-m, 10.0 lb-ft)

NOTE
Apply engine oil to the both side of head cover washer before installing the head cover bolts.

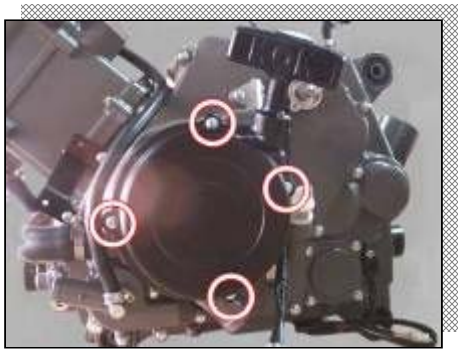
● Tighten the valve timing inspection plug to the specified torque.

Tightening Torque: 23 N-m (2.3 kgf-m, 16.5 lb-ft)



● Apply a small quantity of THREAD LOCK to the bolts.

● Install the recoil starter.



● Install the new O-ring to the water union.

CAUTION
Use a new O-ring to prevent engine coolant leakage.

● Apply engine coolant to the O-ring.

● Install the water union.

● Install the starter motor.

COOLING & LUBRICATION SYSTEM

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Engine Coolant

- At the time of manufacture, the cooling system is filled with a 1:2 mixture of distilled water and ethylene glycol anti-freeze. This 1:2 mixture will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperature above -56℃ (- 69℉).

Anti-freeze density	Freezing point
50%	-30℃ (-22℉)
55%	-40℃ (-40℉)
60%	-55℃ (-67℉)

CAUTION

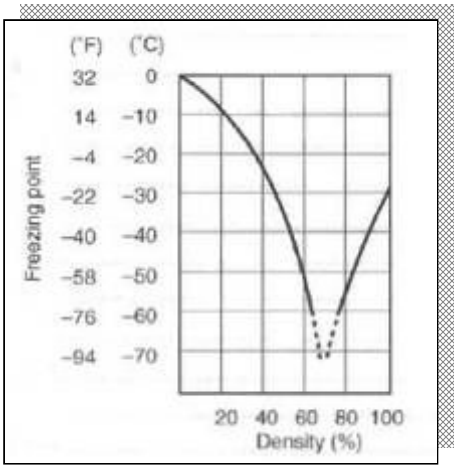
○ Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.
○ Do not use a radiator anti-leak additive.

- 66.7% Engine coolant including reserve tank capacity. For instance.

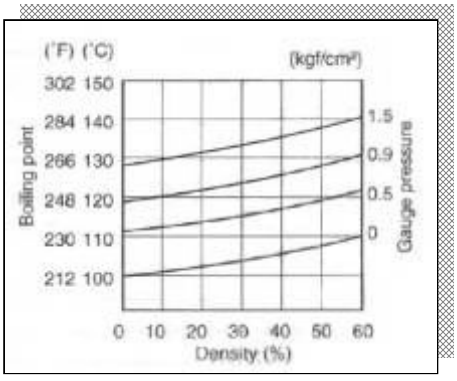
Anti-freeze	1334 ml
Water	666 ml

⚠ WARNING

○ You can be injured by scalding fluid or steam if you open the radiator cap when the engine is hot. After the engine cools, wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow pressure to escape and then turn the cap all the way off.
○ The engine must be cool before servicing the cooling system.
○ Coolant is harmful;
★If it comes in contact with skin or eyes, flush with water.
★If swallowed accidentally, induce vomiting and call physician immediately.
★Keep it away from children.

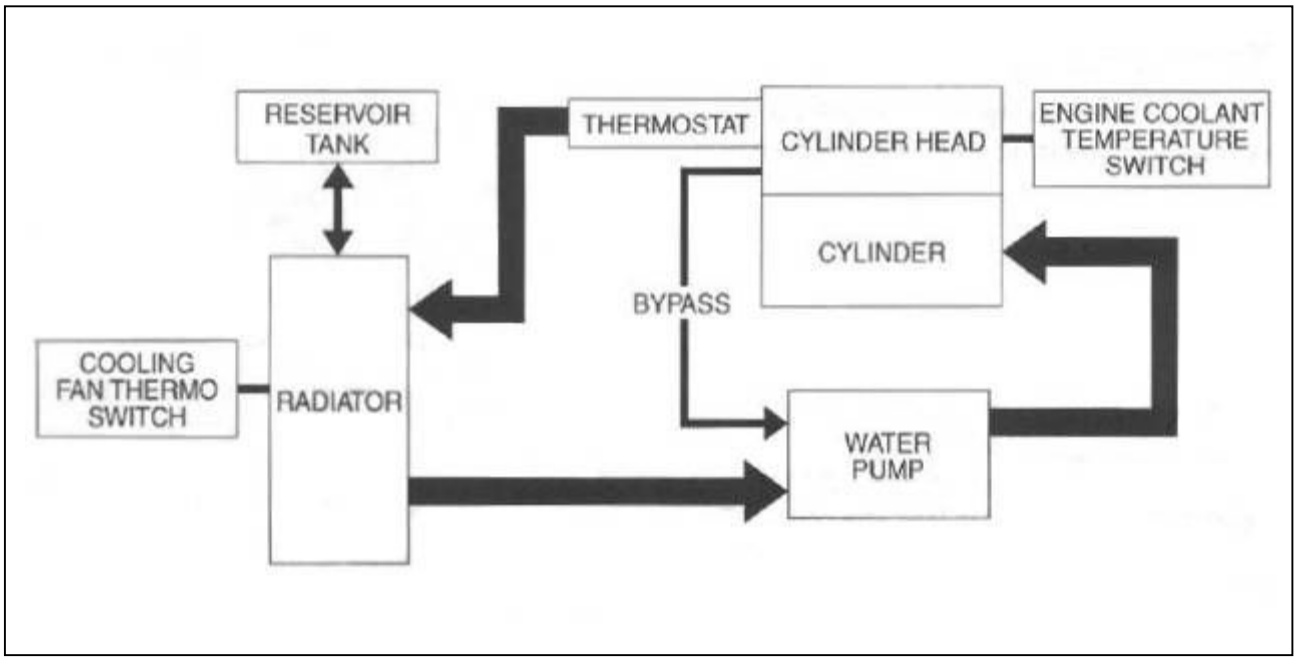


Engine coolant density-freezing point curve.



Engine coolant density-boiling point curve.

Cooling Circuit



Cooling Circuit Inspection

- Before removing the radiator and draining the engine coolant, inspect the cooling circuit for tightness.
- Remove the radiator cap [1] and connect the tester to the filler.

⚠ WARNING
Do not remove the radiator cap when the engine is hot.

- Give a pressure of about 180kpa (1.8kgf/cm², 25 psi) and see if the system holds this pressure for 10 seconds.
- If the pressure should fall during this 10-second interval, it means that there is a leaking point in the system. In such a case, inspect the entire system and replace the leaking the leaking component or part.

⚠ WARNING
When removing the radiator cap tester, put a rag on the filler to prevent spouting of engine coolant.

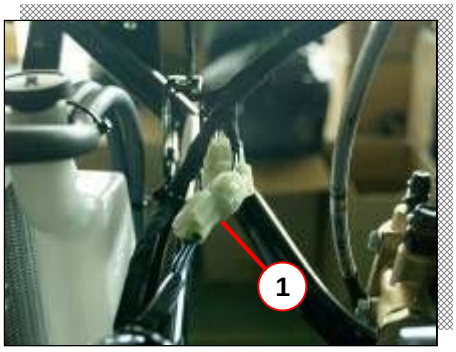
CAUTION
Do not allow the pressure to exceed the radiator cap release pressure, or the radiator can be damaged.

Radiator and Hoses

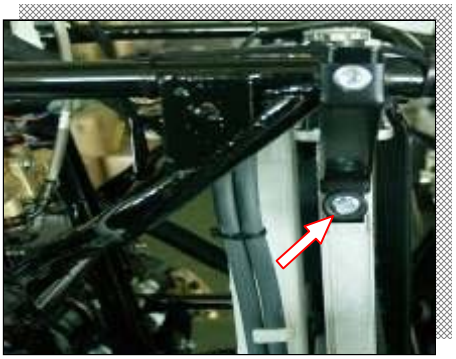
Radiator Removal

- Remove the front fender.
- Remove the left foot board.
- Drain engine coolant by removing the drain plug.

- Remove the right headlight.
- Disconnect the cooling fan motor lead wire coupler [1] and cooling fan thermo-switch leas wire coupler [2].
- Remove the front grill upper cover.
- Disconnect the upper and lower radiator hoses.
- Disconnect the siphon hose from the radiator.



- Remove the mounting bolts and radiator assembly.



Radiator Inspection and Cleaning

- Road dirt or trash stuck to the fins must be removed.
- Use of compressed air is recommended for this cleaning.

- Remove the radiator fin guard net.

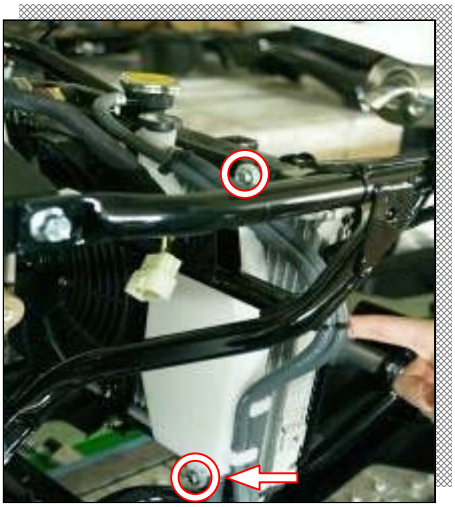
- Fins bent down or dented can be repaired by straightening them with the blade of a small screwdriver.

Radiator Remounting

- Install the radiator in the reverse order of removal.
- Pay attention to the following points:
- Connect the radiator hoses.
- Install the drain plug.
- Pour engine coolant.
- Bleed air from the cooling circuit.

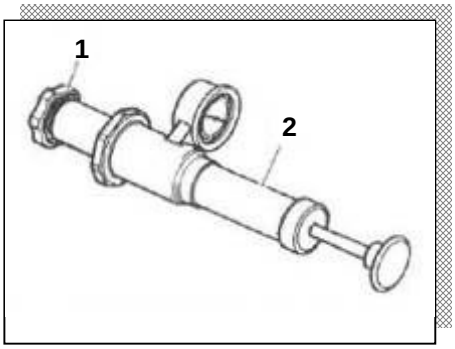
Radiator Reservoir Tank

Removal/Installation



- Remove the reservoir tank mounting bolts and disconnect the siphon hose from the reservoir tank and drain engine coolant.
- Install the reservoir tank in the reverse order of removal.
- Fill the reservoir tank to the upper level line.

Radiator Cap Inspection



- Remove the radiator cap lid.
- Fit the cap [1] to the radiator cap tester [2].
- Build up pressure slowly by operating the tester. Make sure that the pressure build-up stops at 110 – 140 kPa (1.1 – 1.4 kgf/cm² , 15.6 – 19.9 psi) and that, with the tester held standstill, the cap is capable of holding that pressure for at least 10 seconds.
- Replace the cap if it is found not to satisfy either of these two requirements.

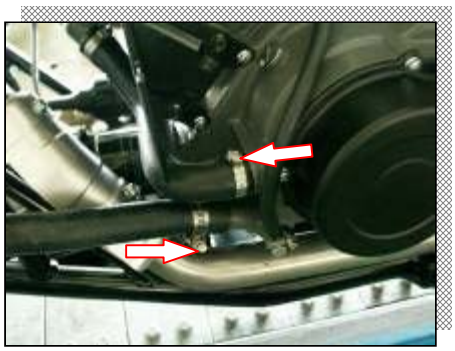
Radiator Cap Valve Opening Pressure	
Standard	110 – 140 kPa (1.1 – 1.4 kgf/cm² , 15.6 – 19.9 psi)

Radiator Hose Inspection

- Remove the front grill upper cover.
- Remove the left headlight.
- Remove the left inner fender
- Remove the left side cover.
- Any radiator hose found in a cracked condition or flattened must be replaced.
- Any leakage from the connecting section should be corrected by proper tightening.

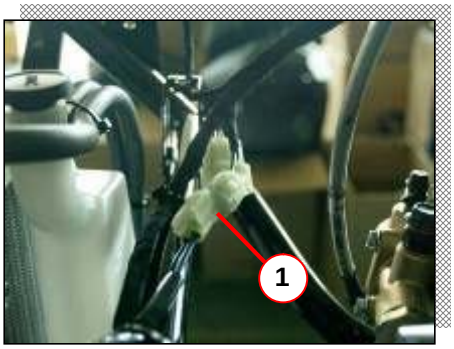
Tightening Torque (Cooling hose clamp): 1.5 N-m

(0.15 kgf-m, 1.0 lb-ft)

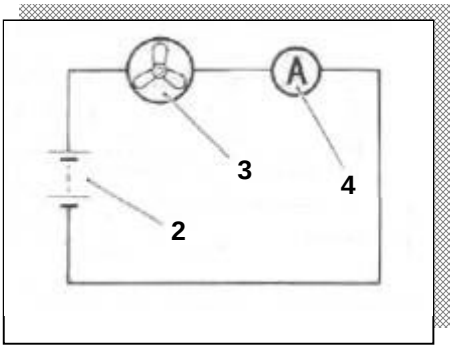


Cooling Fan

Inspection

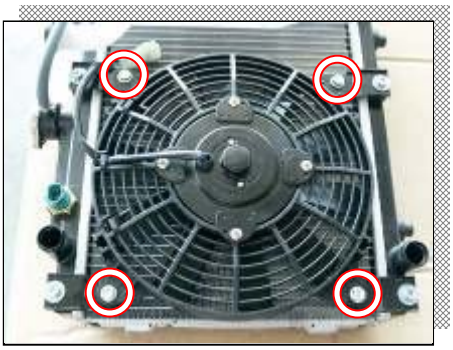


- Disconnect the cooling fan motor lead wire coupler [1].
- Test the cooling fan motor for load current with an ammeter connected as shown in the illustration.
- The voltmeter is for making sure that the battery [2] applies 12 volts to the motor [3]. With the motor with electric motor fan running at full speed, the ammeter [4] should be indicating not more than 5.3 amperes.
- If the fan motor does not turn, replace the cooling fan assembly with a new one.



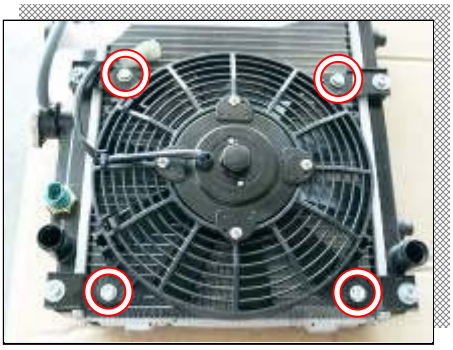
NOTE
When making above test, it is not necessary to remove the cooling fan.

Removal



- Remove the radiator.
- Remove the cooling fan mounting bolts and collars.

Remounting

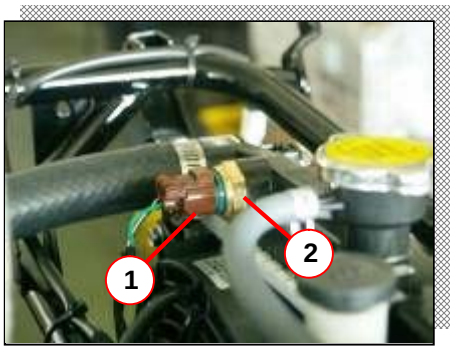


- Install the cooling fan in the reverse order of removal.
- Tighten the cooling fan mounting bolts to the specified torque.

Tightening Torque: 5 N-m (0.5 kgf-m, 3.60 lb-ft)

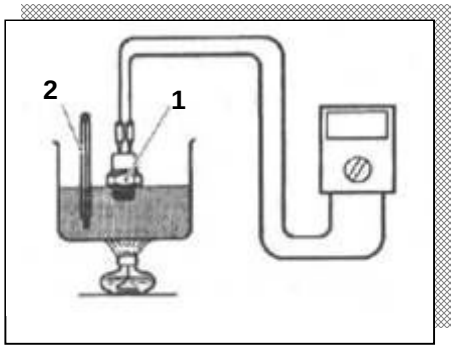
Cooling Fan Thermo-Switch

Removal



- Remove the left headlight.
- Drain engine coolant.
- Disconnect the cooling fan thermo-switch lead wire coupler [1].
- Remove the cooling fan thermo-switch [2].

Inspection



- Check the thermo-switch closing or opening temperatures by testing it at the bench as shown in the figure. Connect the thermo-switch [1] to a circuit tester and place it in the water contained in a pan, which is placed on a stove.
- Heat the water to raise its temperature slowly and read the column thermometer [2] when the switch closes or opens.

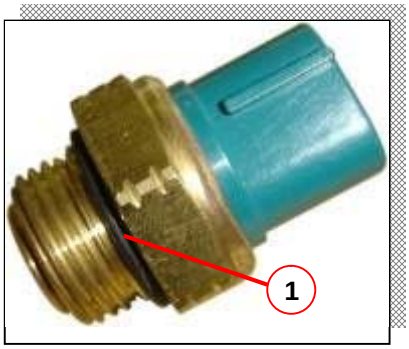
Multi-circuit tester set

Tester knob indication: Continuity test

Cooling Fan Thermo-Switch Operating Temperature	
Standard (OFF to ON)	Approx. 96℃ (205˚F)
Standard (ON to OFF)	Approx. 86℃ (187˚F)

CAUTION
○ Take special care when handling the thermo-switch. It may cause damage if it gets a sharp impact. ○ Do not contact the cooling fan thermo-switch and the column thermometer with a pan

Installation

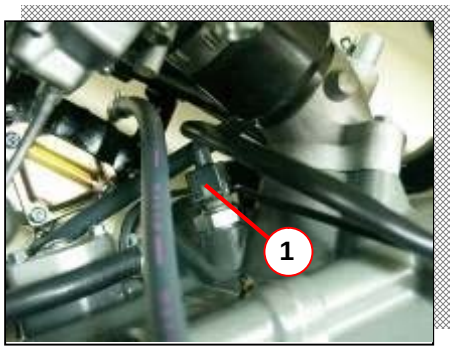


- Install the new O-ring [1].
- Tighten the cooling fan thermo-switch to the specified torque.

  Tightening Torque: 25 N-m (2.5kgf-m, 18.0 lb-ft)
- Pour engine coolant.
- Install the headlight.

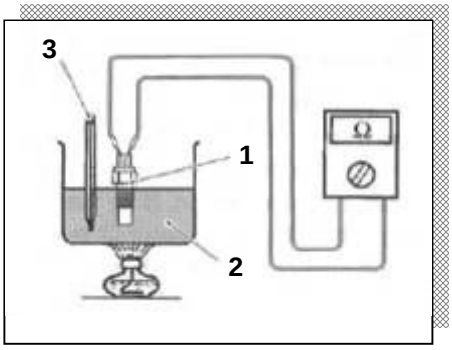
ECT Sensor

Removal



- Remove the left side cover.
- Disconnect the ECT sensor coupler [1].
- Place a rag under the ECT sensor and remove the ECT sensor.

Inspection



- Check the ECT sensor by testing it at the bench as shown in the figure. Connect the ECT sensor [1] to a circuit tester and place it in the water [2] contained in a pan, which is placed on a stove.
- Heat the water to raise its temperature slowly and read the column thermometer [3] and the ohmmeter.
- If the ECT sensor ohmic value does not change in the proportion indicated, replace it with a new one.

Temperature Sensor Specification	
Temperature	Standard Resistance
60℃ (140℉)	Approx. 0.704 kΩ
90℃ (194℉)	Approx. 0.261 kΩ
120℃ (248℉)	Approx. 0.111 kΩ

- If the resistance is noted to show infinity or too much different resistance value, replace the ECT sensor with a new one.

CAUTION
○ Take special care when handling the ECT sensor. It may cause damage if it gets a sharp impact. ○ Do not contact the ECT sensor and the column thermometer with a pan

Installation

- Install the ECT sensor in the reverse order of removal.
- Tighten the ECT sensor to the specified torque.

Tightening Torque: 20 N-m (2.0 kgf-m, 14.44 lb-ft)

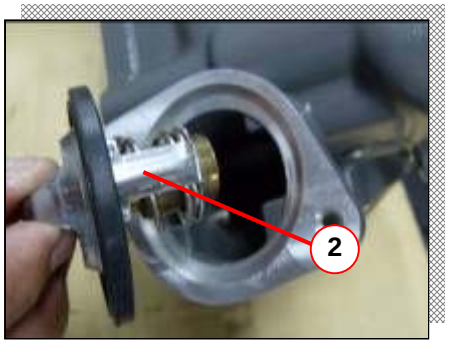
CAUTION
Take special care when handling the ECT sensor. It may cause damage if it gets a sharp impact.

- Pour engine coolant.

Thermostat

Removal

- Remove the left side cover.
- Drain engine coolant.
- Place a rag under the thermostat cover.
- Remove the thermostat cover [1].
- Remove the thermostat [2].



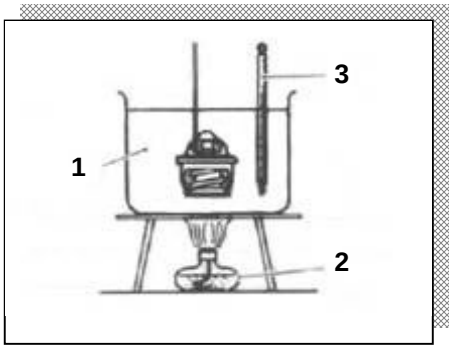
Inspection

- Inspect the thermostat pellet for signs of cracking.
- Test the thermostat at the bench for control action, in the following manner.

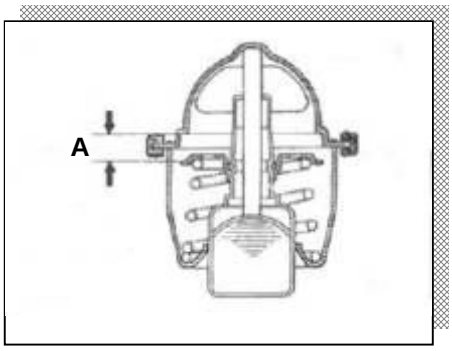
○ Pass a string between flange, immerse the thermostat in the water contained in a beaker, as shown in the illustration. Note that the immersed thermostat is in suspension.

○ Heat the water [1] by placing the beaker on a stove [2] and observe the rising temperature on a thermometer [3].

- Read the thermometer just when opening the thermostat. This reading, which is the temperature level at which the thermostat valve begins to open, should satisfy the standard value.



Thermostat Valve Opening Temperature	
Standard	80 – 84℃ (176 – 183℉)

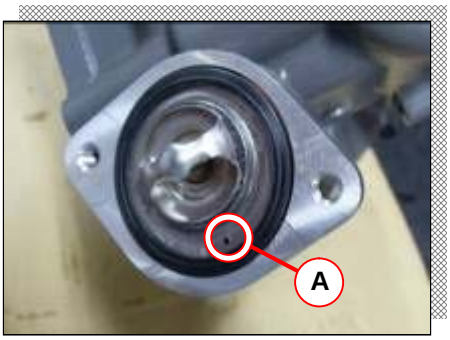


- Keep on heating the water to raise its temperature.
- Just when the water temperature reaches specified value, the thermostat valve should have lifted [A] by at least 7.0mm.

Thermostat Valve Lift	
Standard	Over 7.0mm at 95℃ (Over 0.28 in at 203 ℉)

- A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.

Installation



- Install the thermostat in the reverse order of removal.
- Apply engine coolant to the rubber seal on the thermostat.

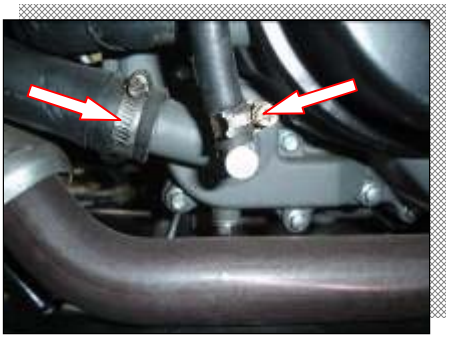
NOTE
The jiggle valve [A] of the thermostat faces upside.

- After installing the thermostat, be sure to add engine coolant.
- Tighten the thermostat cover bolts to the specified torque.

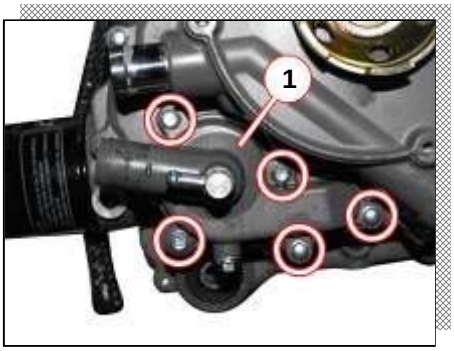
Tightening Torque: 10 N-m (1.0 kgf-m, 7.0 lb-ft)

Water Pump

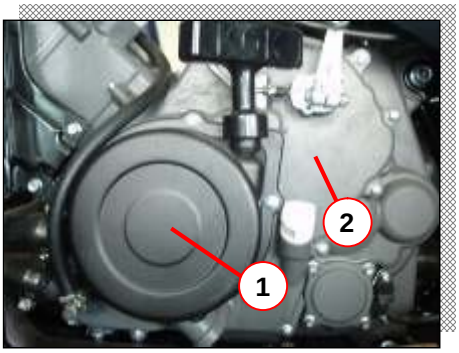
Removal and Disassembly



- Remove the left mud guard.
- Drain engine coolant.
- Drain engine oil.
- Remove the water hoses.
- Remove the water pump cover [1].

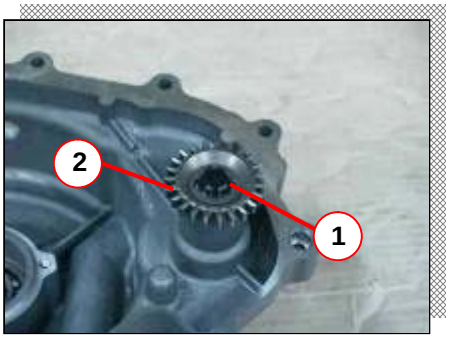


NOTE
Before draining engine coolant, inspect engine coolant leakage between the water pump and crankcase. If engine oil is leaking, visually inspect the oil seal and O-ring. If engine coolant is leaking, visually inspect the mechanical seal and seal ring.

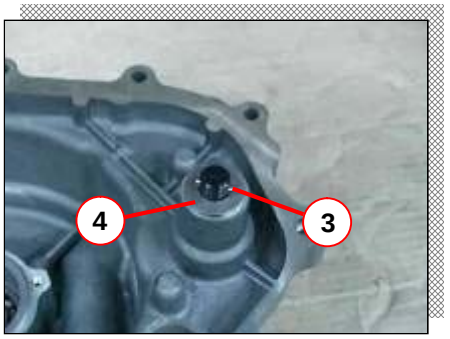


CAUTION
In order to remove or disassemble the water pump, it is necessary to disassemble the recoil starter [1] and engine left crankcase cover [2].

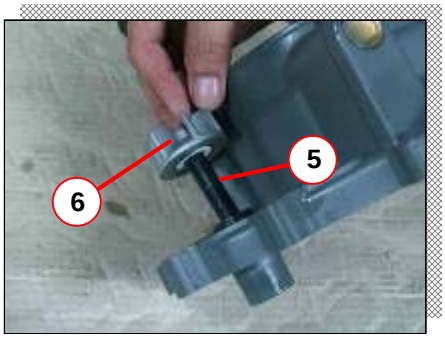
- Remove the circlip [1] and water pump drive gear [2].



- Remove the impeller shaft pin [3] and washer [4].



- Remove the impeller shaft [5] and impeller [6].



- Visually inspect the mechanical seal that install in the impeller and the left crankcase for damage, with particular attention given to the sealing face.
- Replace the mechanical seal that shows indications of leakage. Also replace the seal ring if necessary.
- Remove the mechanical seal using the special tool.

Bearing remover set

CAUTION
The removed mechanical seal must be replaced with a new one.

- Place a rag over the water pump.
- Remove the oil seal using a suitable bar.

CAUTION
The removed oil seal must be replaced with a new one.

- Remove the needle bearing from the front side, as shown.
- Visually inspect the oil seal for damage, with particular attention given to the lip.
- Inspect the needle bearing for wear or damage, replace it if the damages have been found.
- Replace the oil seal that shows indications of leakage.

- Visually inspect the water pump cover for damage.
- Replace the water pump cover if necessary.

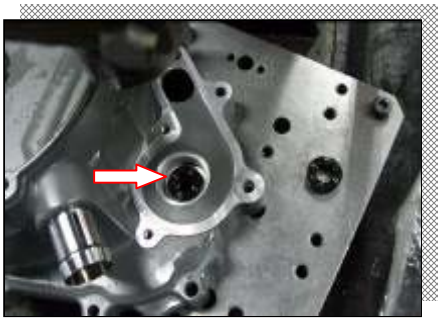
● Visually inspect the impeller and its shaft for damage.

Reassembly and Installation

● Reassemble and install the water pump in the reverse order of removal and disassembly. Pay attention to the following points:

● Install the needle bearing from the other side, and make sure the mark is face to the engine.

● Apply a small quantity of the GREASE to the oil seal lip.

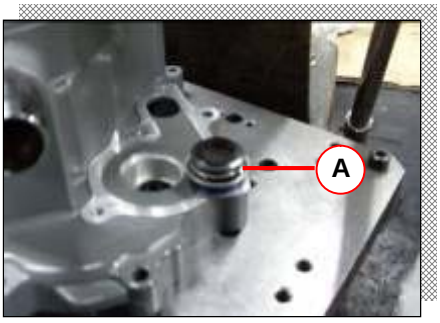


● Install the oil seal using the special tool.

NOTE
The stamped mark on the oil seal faces outside.

● Install the new mechanical seal using the special tool.

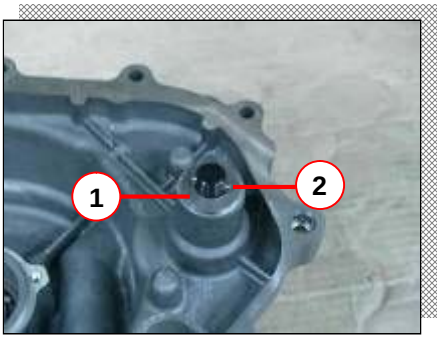
NOTE
On the new mechanical seal, the sealer [A] has been applied.



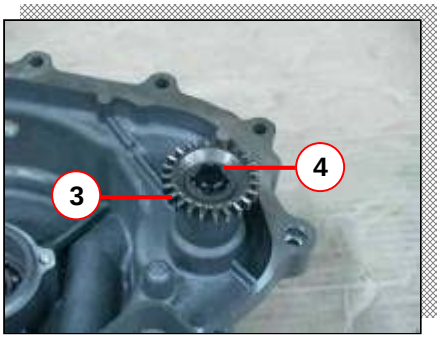
● Apply GREASE to the impeller shaft.

● Install the impeller shaft and the impeller to the water pump body.

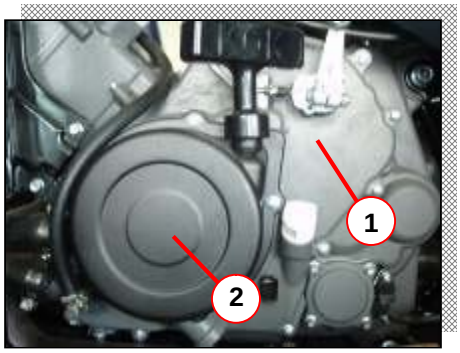
● Install the washer [1] and impeller shaft pin [2] to the impeller shaft.



● Install the water pump driven gear [3] and circlip [4].



● Install the engine left crankcase cover [1] and recoil starter [2].



● Install the new O-ring [1].

CAUTION
Use the new O-rings to prevent engine coolant and engine oil leakage.

NOTE
○ Apply engine coolant to the O-ring [1].

● Install the water pump cover [1] and tighten its mounting bolts to the specified torque.

Tightening Torque: 10 N-m (1.0 kgf-m, 7.0 lb-ft)

● Connect the radiator hoses.

● Pour engine coolant.

Lubrication System

Oil Pressure

● Check the engine oil pressure periodically.

Oil Pressure	
Standard	Above 15 kPa (0.15 kgf/cm², 2.0 psi)

(See Periodic Maintenance)

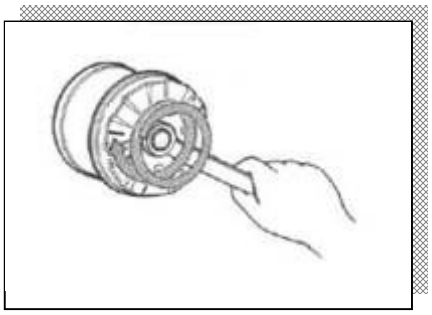
Oil Filter

● Drain the engine oil.

● Remove the left inner fender.

● Remove the oil filter [1] with the special tool.

● Apply slightly of engine oil to the gasket of the new oil filter, before installation.



● Install the new oil filter to the engine. Turn it by hand until you feel that the oil filter gasket has contacted the oil filter mounting surface. Then, tighten the oil filter two full turns with the special tool.

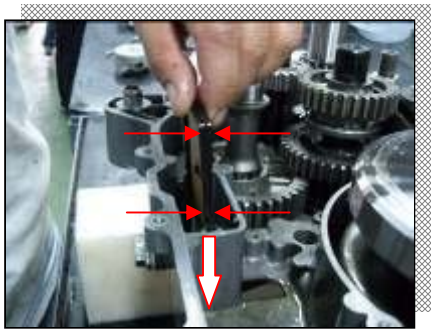
D003 - Oil filter wrench

NOTE
To properly tighten the oil filter, use the special tool. Never tighten the oil filter by hand.

● Pour new engine oil.

Oil Sump Filter

NOTE
When installing the oil sump filter, always use the new one to keep oil clean. And the thinner side is face to the CVT.

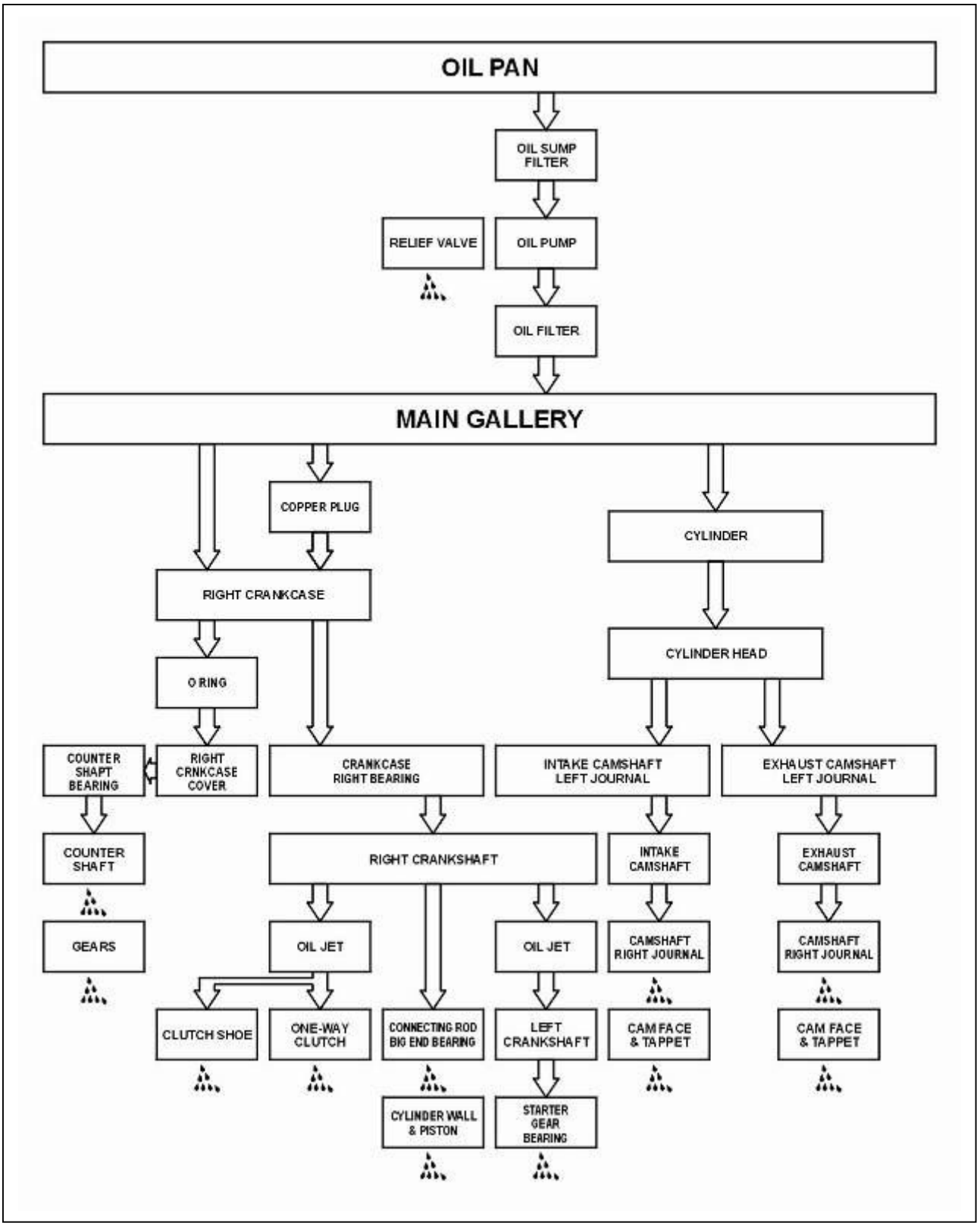


Oil Pump

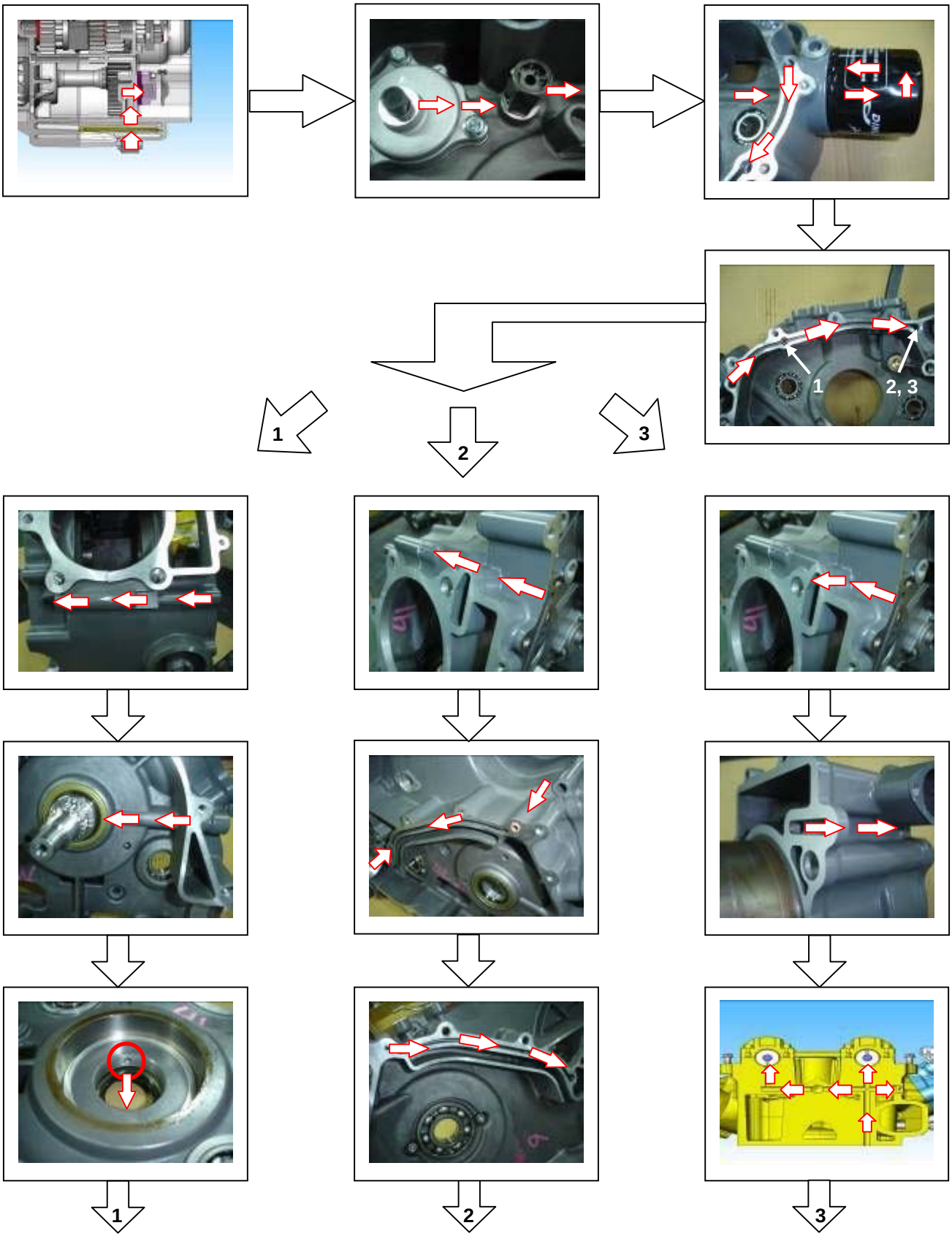
● Rotate the oil pump by hand and check that it moves smoothly. If it does not move smoothly, replace the oil pump assembly.

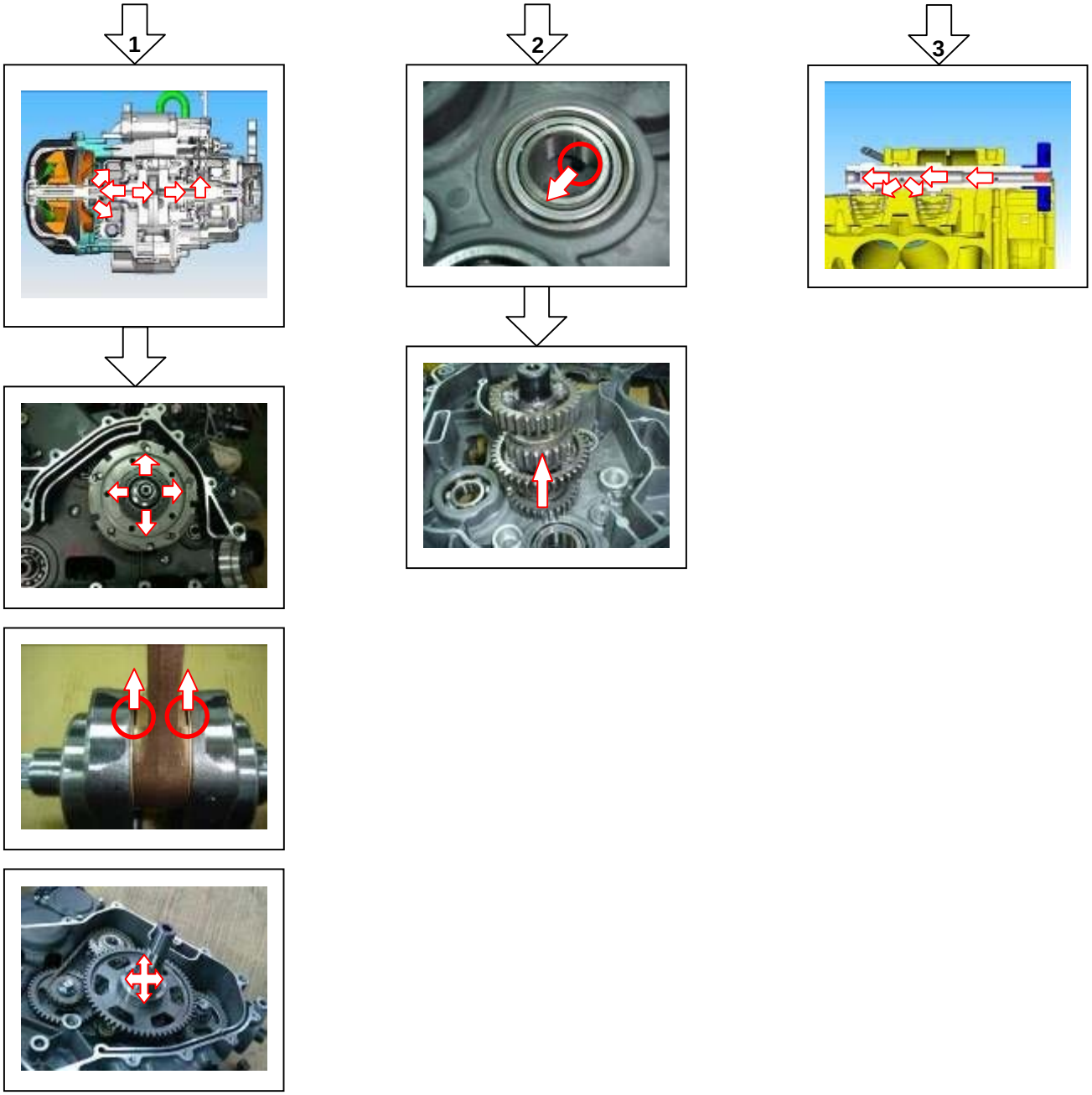
CAUTION
○ Do not attempt to disassemble the oil pump assembly. ○ The oil pump is available only as an assembly.

Engine Lubrication System Chart



Engine Lubrication System




1
2
3

ELECTRICAL SYSTEM

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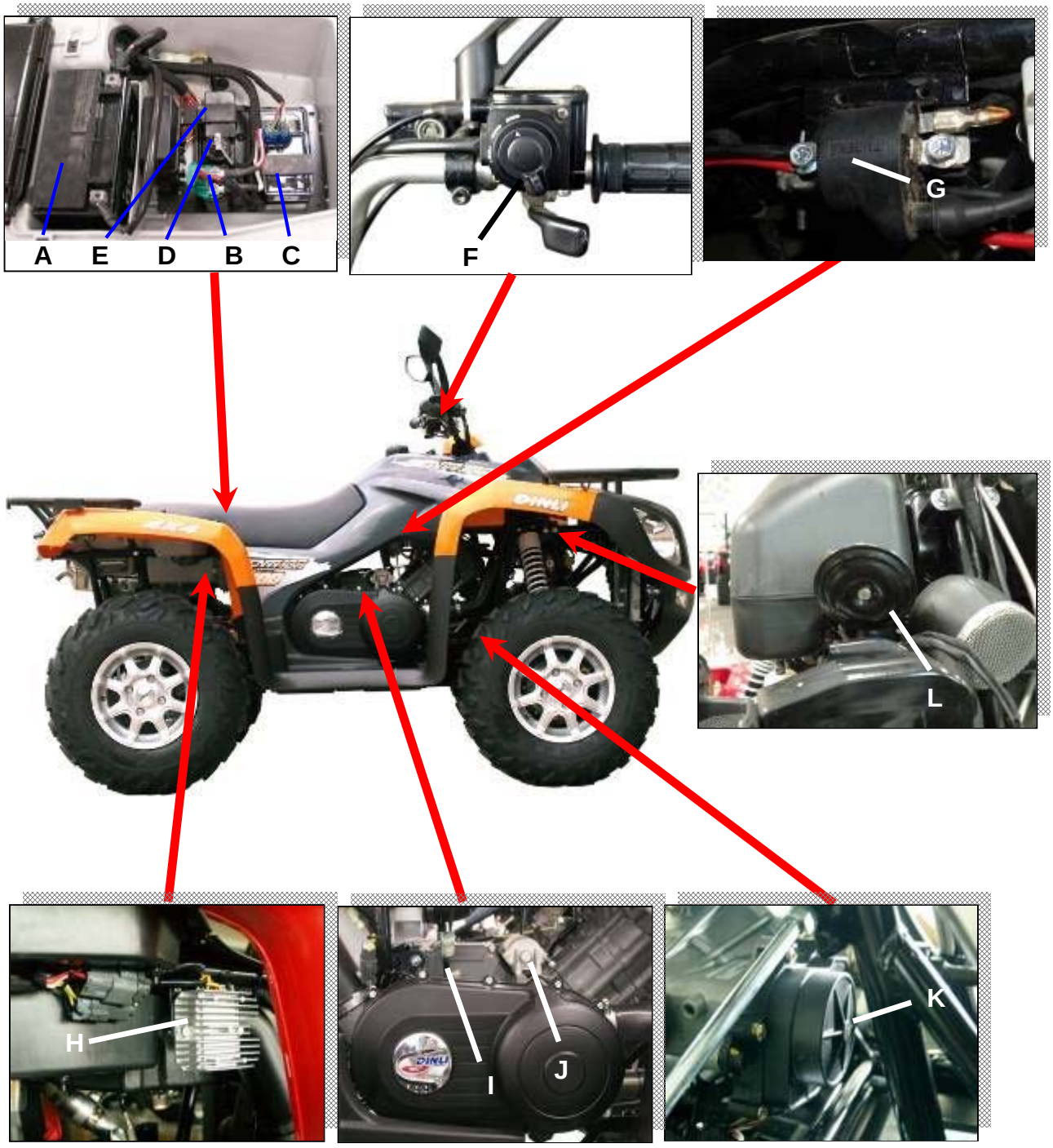
Specifications

Item			Standard
Battery Capacity			12 V ; 20Ah
Alternator type			Three-Phase AC
Ignition system			CDI
Charging voltage (Regulator/rectifier output)			DC 14 -15 V
Alternator no-load output voltage			AC 65 V and more at 5000 rpm
Stator	Charge Coil	Y1-Y2	0.49 Ω
		Y2-Y3	0.49 Ω
		Y3-Y1	0.49 Ω
		Y-Ground	∞
	Pulser Coil	Bu/Y – G/W	110 ± 15%
Ignition Coil		Primary	0.2 Ω ± 15%
		Secondary	6.3 kΩ ± 20% (At 20℃)
Spark plug		Gap	0.7~0.8 mm
		Cable resistance	5 kΩ
Starter motor		Nominal Output	0.7 kW
		Reduction Ratio	28.235

Parts Location



A	Battery	G	Ignition Coil
B	Starter Circuit Relay	H	Regulator/Rectifier
C	CDI Unit	I	Gear Position Indicator
D	Flash Relay	J	Starter Motor
E	Position Light Relay	K	2WD/4WD/Diff-4WD Actuator
F	Transfer Selecting Switch	L	Horn

A	High/Low Beam Switch	G	Ignition Switch
B	Hazard Lights Switch	H	Spark Plug
C	Horn Switch	I	Cooling Fan
D	Indicator Switch	J	Temperature Sensor
E	Diff-4WD Confirm Button	K	Speed Sensor
F	Starter Button		

Precautions

There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

○ Do not reverse the battery lead connections. This will burn out the diodes in the electrical parts.

○ The MF battery used in this vehicle does not require maintenance.

○ During normal charging, no hydrogen gas is produced. However, if the battery is overcharged, hydrogen gas may be produced. Therefore, be sure there are no fire or spark sources nearby when charging the battery.

○ Be sure to recharge the battery in a well-ventilated and open area.

○ Note that the charging system for the MF battery is different from that of a conventional battery. Do not replace the MF battery with a conventional battery.

○ When disconnecting terminals from the battery for disassembly or servicing, be sure to connect the negative battery lead wire, first.

○ When connecting the battery lead wires, be sure to connect the positive battery lead wire, first.

○ If the terminal is corroded, remove the battery, pour warm water over it and clean it with a wire brush.

○ After connecting the battery, apply a light coat of grease to the battery terminals.

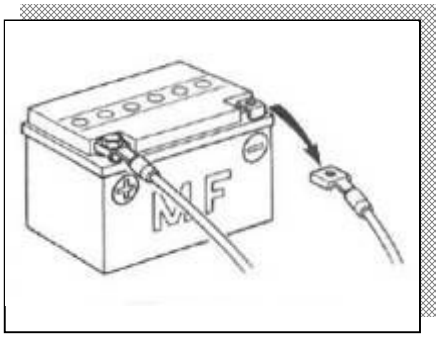
○ Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.

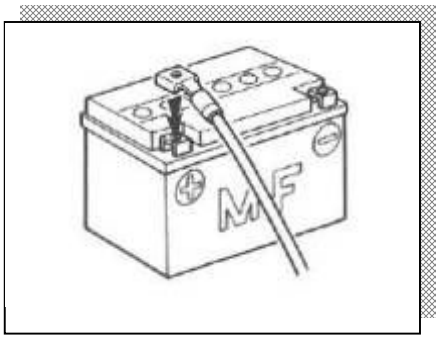
○ The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.

○ To prevent damage to electrical parts, do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running.

○ Because of the large amount of current, never keep pushing the starter button when the starter motor not have to turn over, or the current may burn out the starter motor windings.

○ Do not use a illumination bulb rated for other than the voltage or wattage specified in the wiring diagram, as the handle cover could be warped by excessive heat radiated from the bulb.



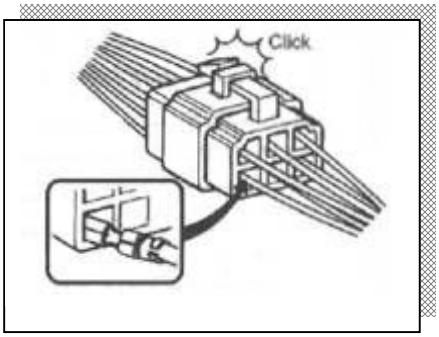


CAUTION
Take care not to short the leads that are directly connected to the battery positive (+) terminal to the chassis ground.

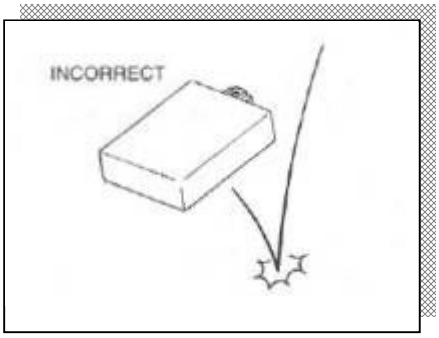
○ Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was caused by some other item or items, they too must be repaired or replaced, or the new replacement will soon fail again.

○ Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. poor wires and bad connections will affect electrical system operation.

○ Measure coil and winding resistance when the part is cold (at room temperature).



○ Be careful not to drop the part with a semi-conductor built in such as a CDI unit.

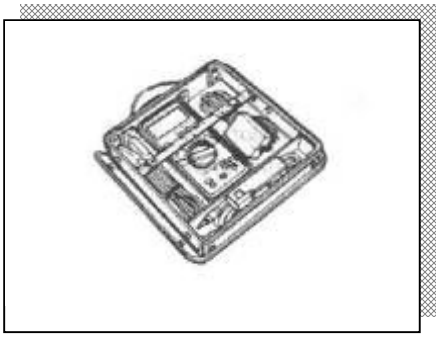


○ Properly use the multi-circuit tester (+) and (−) probes. Improper use can cause damage to the vehicle and tester.

○ If the voltage and current values are not known, begin measuring in the highest range.

○ When measuring the resistance, make sure that no voltage is applied. If voltage is applied, the tester will be damaged.

○ After using the tester, be sure to turn the switch to the OFF position.



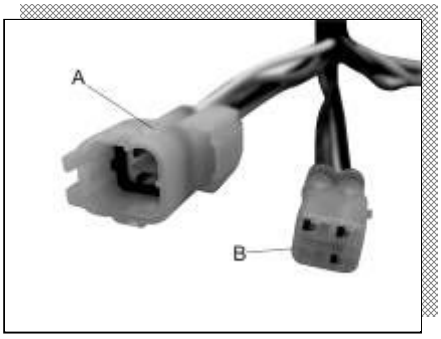
CAUTION
Before using the multi-circuit tester, read its instruction manual.

Multi-Circuit Tester Set

○ Color codes:

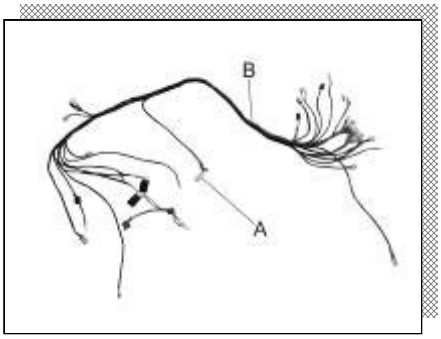
B	Black	G	Green	P	Pink
Bu	Blue	Gr	Gray	Pu	Purple
Br	Brown	LB	Light blue	R	Red
Ch	Chocolate	LG	Light green	W	White
DG	Dark green	O	Orange	Y	Yellow

○ Electrical Connectors:
Female Connectors [A]
Male Connectors [B]



Electrical Wiring

Wiring Inspection



● Visually inspect the wiring for signs of burning, fraying, etc.

★ If any wiring is poor, replace the damaged wiring.

● Pull each connector [A] apart and inspect it for corrosion, dirt, and damage.

★ If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.

● Check the wiring for continuity.

○ Use the wiring diagram to find the ends of the lead which is suspected of being a problem.

○ Connect the hand tester between the ends of the leads.

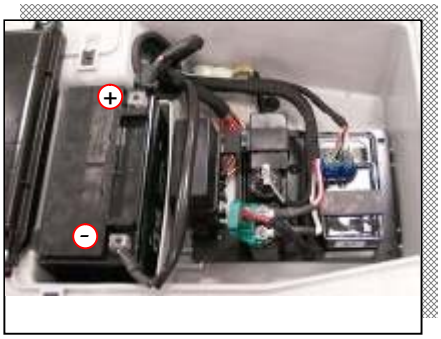
○ Set the tester to the x 1 Ω range, and read the tester.

★ If the tester does not read 0 Ω the lead is defective. Replace the lead or the wiring harness [B] if necessary.

Multi-Circuit Tester Set

Battery

Battery Removal



- Disconnect the battery negative (-) cable [Black] first and then the positive (+) cable [red].
- Take out the battery.

s

Battery Installation

- Connect the positive cable first and then the negative cable.

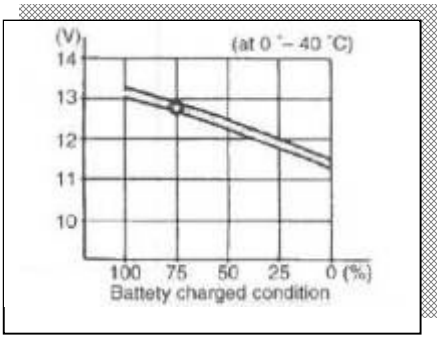
Battery Charging

⚠ WARNING
Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals, which could ignite any battery gases.

The battery is a maintenance-free design and construction. Use of conventional lead-acid batteries is not recommended. No electrolyte or refilling water is required. Because this battery is a completely sealed type, abuse of the battery can cause an explosion.

Please adhere to the following points:

1. Follow the instructions shown on battery package for preparation and filling with battery electrolyte.
2. Never interfere with the sealed state of the battery.
3. Check the charging conditions with a voltmeter (Normal charging voltage should be 12.8V)
4. This battery may be installed only if replaces a similar sealed type battery.
5. Keep away from high temperature of fire.
6. In the case of an accident sulfuric acid may escape. Avoid contact with skin, eyes or clothing.



Charging Method

Normal Charge: 1.8A 5~10 hrs
Fast Charge : 18A 0.5 hrs

New Battery:

Use of conventional lead-acid batteries is not recommended.

Battery type: **GS, GTX20L-BS**

CAUTION
NEVER attempt to add electrolyte or water to the maintenance-free design and construction. Doing so will damage the case and shorten the life of the battery.

Charging Procedure

- Remove the battery (see Battery Removal).
- Connect a charger to the battery BEFORE plugging it in or turning it on.
- Set the charging rate and time according to the battery condition previously determined

CAUTION
Always remove the battery from the vehicle for charging. Do not use a high rate battery charger, as is typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at a high rate causes excess heat, which can warp the plates and cause internal shorting. Higher-than-normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.

- Turn the charger off or unplug it, then disconnect it from the battery.
- Check battery condition.

★ If the battery condition indicates that is not fully charged, additional charging time is necessary.

Battery Test Charging

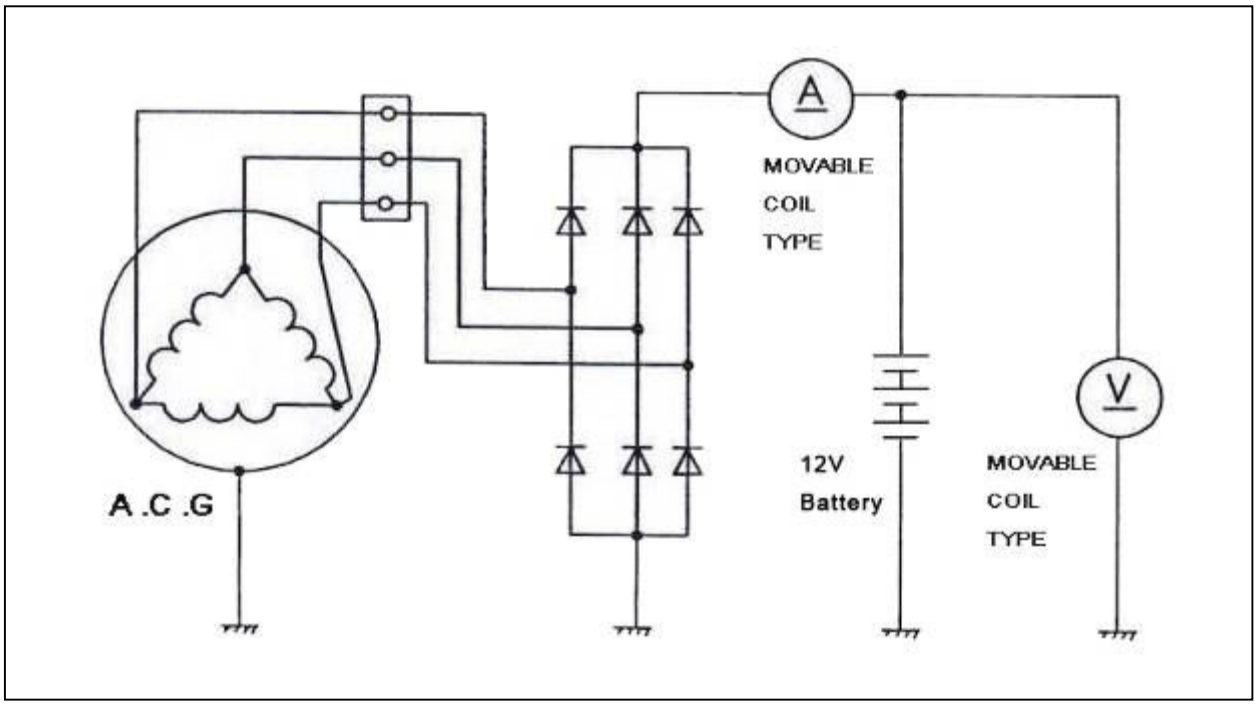
- If the battery is suspected of being defective, sulfated, or unable to take a charge, consult the table.
- To test charge a battery, perform the ordinary charging procedure and monitor the battery voltage and other signs as mentioned below.

★ If the battery voltage suddenly jumps to over 13 V just after the start of charging, the plates are probably sulfated. A good battery will rise to 12 V immediately and then gradually go up to 12.5 or13 V in about 30 min. to an hour after the start of charging.

- If there does not appear to be enough sediment in a cell to short the plates, but that cell has a very low specific gravity after the battery is fully charged, the trouble may be that there is not enough acid in that one cell. In this case only, sulfuric acid solution may be added to correct the specific gravity.

★ If a fully charged battery doesn't lose its charge after 2 to 7 days; or if the specific gravity drops markedly, the battery is defective. The self-discharge rate of a good battery is only about 1% per day.

Charging System



Troubleshooting

battery runs down quickly

Step1: Check accessories which use excessive amounts of electricity.
Are accessories being installed?

YES	Remove accessories.
NO	Move to Step 2.

Step2: Check the battery for current leaks.
Is the battery current leakage OK?

YES	Move to Step 3.
NO	● Short circuit of wire harness. ● Faulty electrical equipment.

Step3: Measure the regulated voltage between the battery terminals.
Is the regulated voltage OK?

YES	● Faulty battery. ● Abnormal driving condition.
NO	Move to Step 4.

Step4: Measure the resistance of the alternator coil.
Is the resistance of alternator coil OK?

YES	Move to Step 5.
NO	● Faulty alternator coil. ● Disconnected lead wires.

Step5: Measure the alternator no-load performance.
Is the alternator no-load performance OK?

YES	Move to Step 6.
NO	Faulty alternator.

Step6: Inspect the regulator/rectifier.
Is the regulator/rectifier OK?

YES	Move to Step 7.
NO	Faulty regulator/rectifier.

Step7: Inspect wirings.
Is the wirings OK?

YES	Faulty battery.
NO	● Short circuit of wire harness. ● Poor contact of couplers.

Battery overcharges.
- Faulty regulator/rectifier.
- Faulty battery.
- Poor contact of alternator lead wire coupler.

Inspection

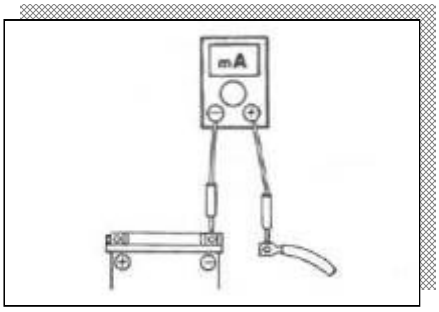
Battery Current Leakage

- Remove the seat.
- Turn the ignition switch to the OFF position.
- Disconnect the battery (-) lead wire [1].
- Measure the current between (-) battery terminal and the (-)battery lead wire with the multi-circuit tester. If the reading exceeds the specified value, leakage is evident.

Multi-Circuit Tester Set

Tester knob indication: Current (DCA, 20 mA)

Battery current (leak): Under 14 mA



CAUTION
○ Because the current leak might be large, turn the tester to high range first to avoid tester damage. ○ Do not turn the ignition switch to the “ON” position when measuring current.

NOTE
When checking for excessive current leakage, remove the couplers and connectors, one by one, so as to locate the position of trouble.

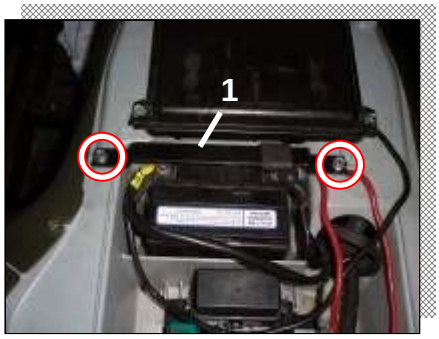
Regulator/Rectifier Inspection

- Check the battery condition (see Battery section)
- Warm up the engine to obtain actual alternator operating conditions.
- Check that the ignition switch is turned off, and connect the multi-circuit tester to the battery terminal.
- Start the engine, and note the voltage readings at various engines speeds with the headlight turned on and then turned off. The readings should show nearly battery voltage when the engine speed is low, and as the engine speed rises, the readings should also rise. But they must be kept under the specified voltage.

Regulator/ Rectifier Output Voltage

Tester Range	Connections		Reading
	Tester (+) to	Tester (-) to	
25 V DC	Battery (+)	Battery (-)	14 ~ 15 V

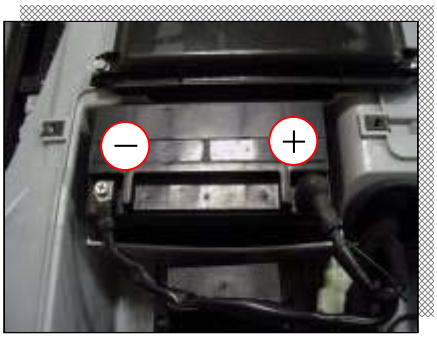
- Turn off the ignition switch to stop the engine, and remove the seat.
- Remove the battery stay [1].
- Measure the DC voltage between the (+) and (−) terminals with the multi-circuit tester.



★ If the regulator/rectifier output voltage is kept between the values given in the table, the charging system is considered to be working normally.

★ If the output voltage is much higher than the values specified in the table, the regulator/rectifier is defective or the regulator /rectifier leads are loose or open.

★ If the battery voltage does not rise as the engine speed increases, then the regulator/rectified is defective or the alternator output is insufficient for the loads, check the alternator and regulator/rectifier to determine which part is defective.

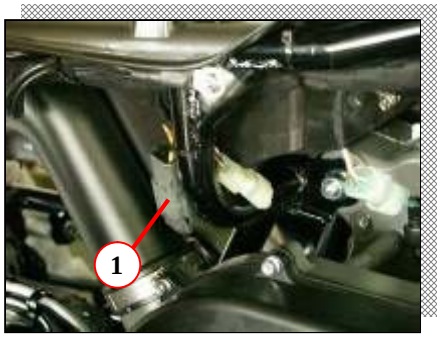


NOTE
When making this test, be sure that the battery is in fully-charged condition.

Multi-Circuit Tester Set

Tester knob indication: Voltage (DCV)

Alternator coil resistance



- Disconnect the alternator coupler [1].
- Measure the resistance between the three lead wires with the multi-circuit tester.
- If the resistance is out of specified value, replace the stator with a new one. Also, check that the generator core is insulated properly.

Multi-Circuit Tester Set

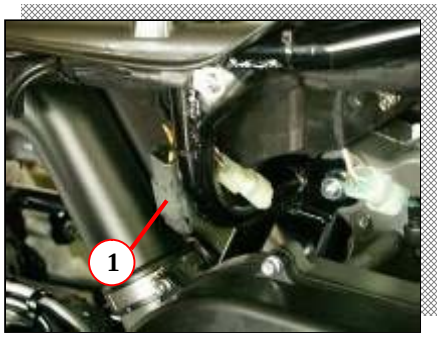
Tester knob indication: Resistance (Ω)

Alternator coil resistance: 0.1 – 1.0Ω (Y-Y)

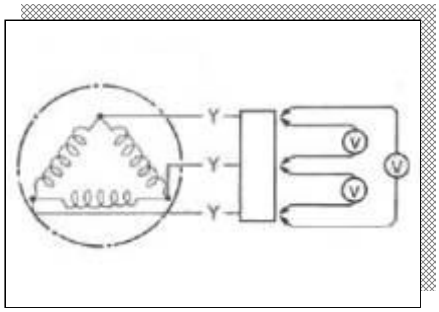
∞Ω (Y-Grnd)

NOTE
When making above test, it is not necessary to remove the alternator.

Alternator no-load performance



- Disconnect the alternator coupler [1].
- Start the engine and keep it running at 5000 rpm.
- Measure the voltage between three lead wires with the multi-circuit tester.
- If the tester indicates under the specified value, replace the alternator with a new one.



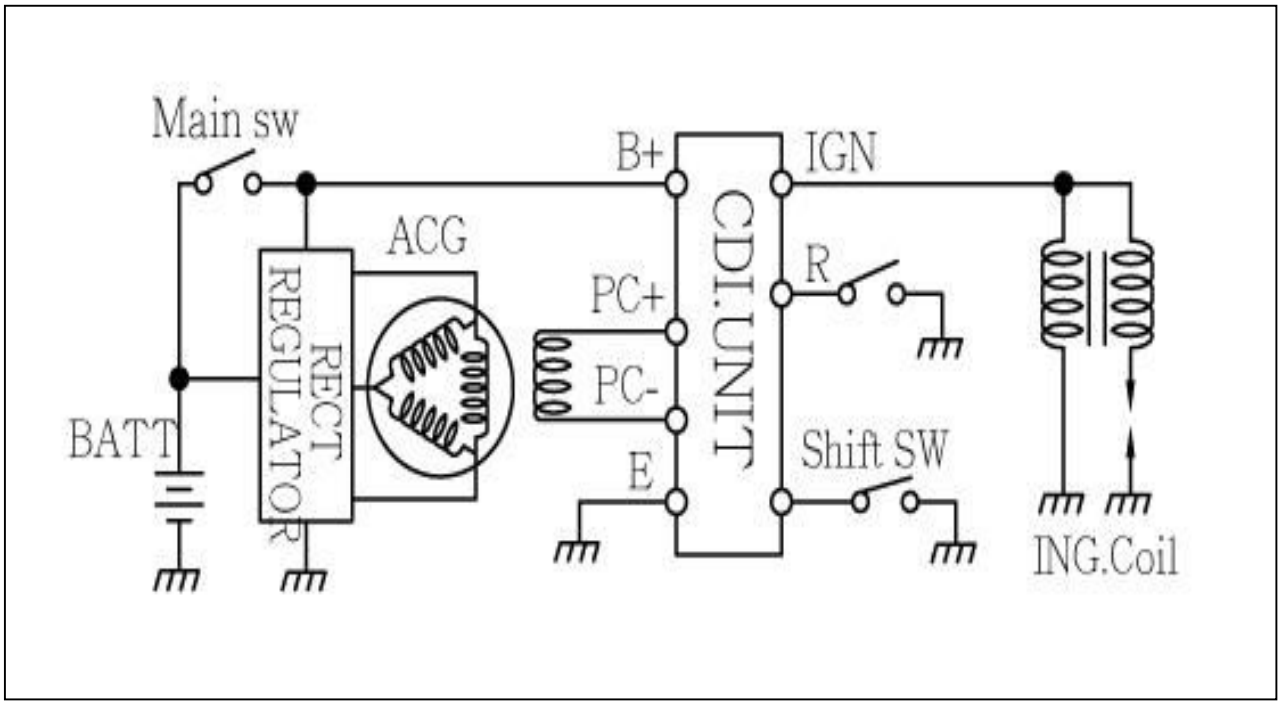
Multi-Circuit Tester Set

Tester knob indication: Voltage (ACV)

Alternator no-load performance:

65 V and more at 5000 rpm (When engine is cold)

Ignition System



⚠ WARNING
The ignition system produces extremely high voltage. Do not touch the spark plug, ignition coil, or spark plug lead while the engine is running, or you could receive a severe electrical shock.

CAUTION
Do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent CDI unit damage. Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the diodes and CDI unit. Use the standard regulator/rectifier, or the CDI unit will be damaged.

Troubleshooting

No spark or poor spark

NOTE
○ Check that the transmission is in neutral. ○ Check that the fuse is not blown and the battery is fully charged before diagnosing.

Step1: Check the ignition system couplers for poor connections.
Is there connection in the ignition system couplers?

YES	Move to Step 2.
NO	Poor connection of couplers.

Step2: Inspect the spark plug.
Is the spark plug OK?

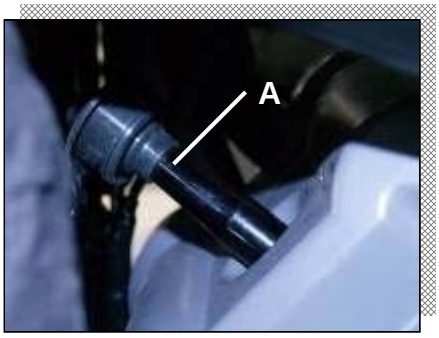
YES	Move to Step 3.
NO	Faulty spark plug.

Step3: Inspect the ignition coil.
Is the ignition coil OK?

YES	Open circuit in wiring harness.
NO	• Poor connection of ignition coil. • Faulty ignition coil.

Spark Plug Removal/Installation

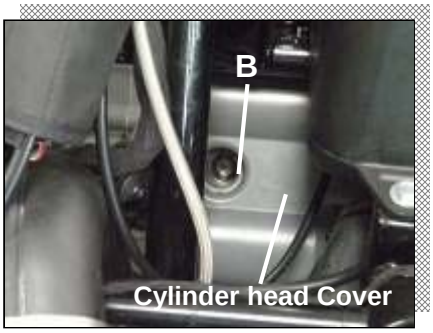
- Remove high voltage cable [A].
- Remove or install the spark plug [B] using the spark plug wrench from the vehicle right side.



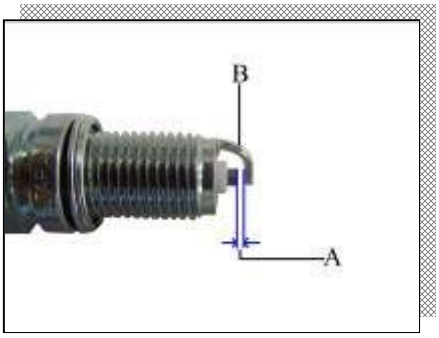
- When installing the spark plug, make sure to tighten the spark plug to the specified torque.
  Tightening Torque: 14 N-m (1.4 kgf-m, 10.0 lb-ft)

Spark Plug Cleaning/ Inspection

- Clean the spark plug, preferably in a sandblasting device, and then clean off any abrasive particles. The plug may also be cleaned using a high flash-point solvent and a wire brush or other suitable tool. If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. Use the standard spark plug or its equivalent.



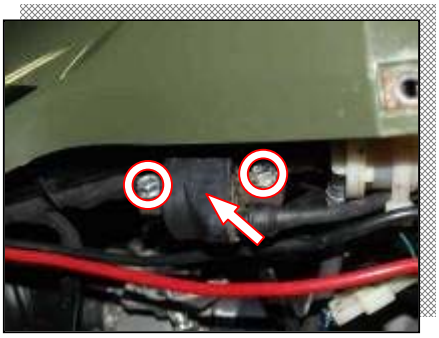
Spark Plug Gap



- Measure the gap [A] with a wire-type thickness gauge.
- If the gap is incorrect, carefully bend the side electrode [B] with a suitable tool to obtain the correct gap.

Spark Plug Gap: 0.7 ~ 0.8 mm

Ignition Coil Removal



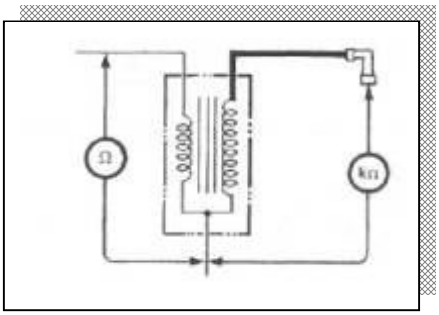
- Remove the ignition coil by removing its bolts.

Ignition Coil Installation

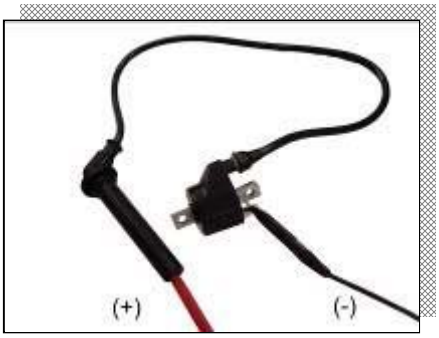
- Connect the primary winding leads to the ignition coil terminals

Ignition Coil Inspection

Ignition coil resistance



- Remove the ignition coil.
- Measure the primary winding resistance as follows:
  - ○ Connect the tester between the coil terminals.
  - ○ Set the tester to the × 1Ω range, and read the tester.
- Measure the secondary winding resistance as follows:
  - ○ Remove the plug cap by turning it counterclockwise.
  - ○ Connect the tester between the spark plug lead and terminal.
  - ○ Set the tester to the × 20 kΩ range, and read the tester.
  - ★ If the multi-circuit tester does not read as specified, replace the coil.
  - ○ To install the plug cap, turn it clockwise.



Multi-Circuit Tester Set

Tester knob indication: Resistance (Ω)

Ignition coil resistance

Primary : 0.17 – 0.23Ω (Terminal - Ground)

Secondary: 5.0 – 7.6kΩ (Spark plug cap - terminal)

CDI Output Test: (Using Peak Reading Adaptor)

● Measure the CDI output voltage by using the multi-circuit tester.

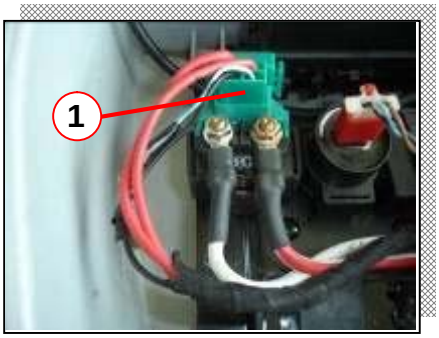
Average Output w/Digital Voltmeter with or without Peak Reader:

200~250 DCV

Multi-Circuit Tester Set

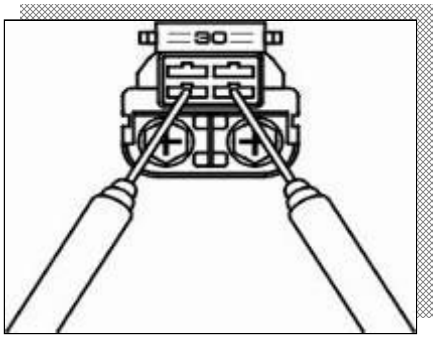
Starter Relay Inspection

● Remove the seat.
● Disconnect the battery (－) lead wire from the battery.
● Disconnect the starter motor lead wire, battery lead wire and starter relay coupler [1].
● Remove the starter relay.



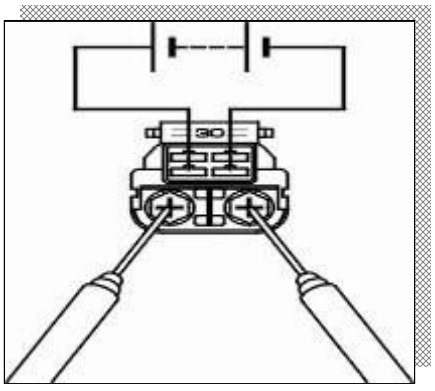
● Measure the relay coil resistance between the terminals with the multi-circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

Multi-Circuit Tester Set
Tester knob indication: Resistance (Ω)
Starter relay resistance: 3 – 5Ω



● Apply 12 V to [A] and [B] terminals and check for continuity between the positive and negative terminals with the multi-circuit tester. If the starter relay clicks and continuity is found, the relay is OK.

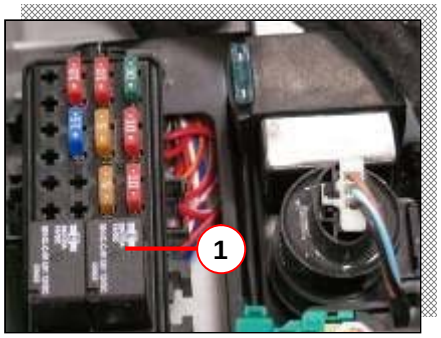
Multi-Circuit Tester Set
Tester knob indication: Continuity test



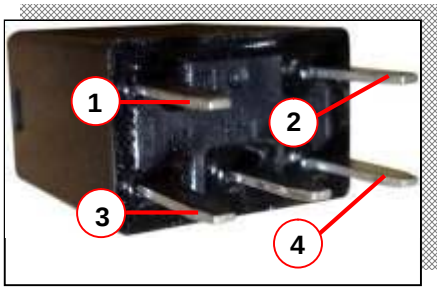
CAUTION
Do not apply battery voltage to the starter relay for five seconds and more, since the relay coil may overheat and get damaged.

Main Relay Inspection

- Remove the seat.
- Remove the fuse box cover.
- Remove the main relay [1].



- First check the insulation between [1] and [4] terminals with the tester. Then apply 12 V to terminals [2] and [3], and check the continuity between [1] and [4]. If there is no continuity, replace the main relay with a new one.



Multi-Circuit Tester Set

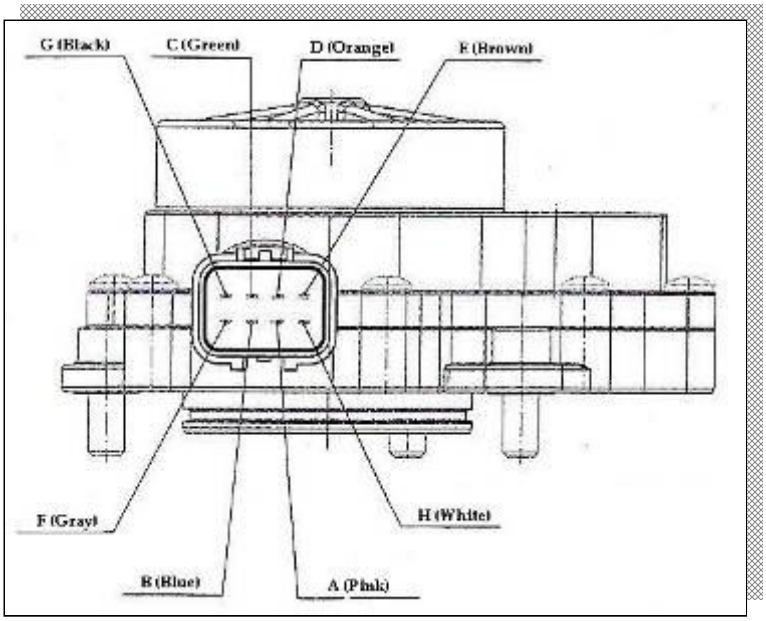
Tester knob indication: Continuity test

Transfer Selecting System

Inspection

- Remove the front rack and fender.
- Probe the terminals and check the voltage changing between the connected terminals when shifting the transfer selecting switch.
- The voltage must maintain at 12 V, if the voltage does not conform to the standard, check the continuity of each lead wire or replace the actuator assembly with a new one.

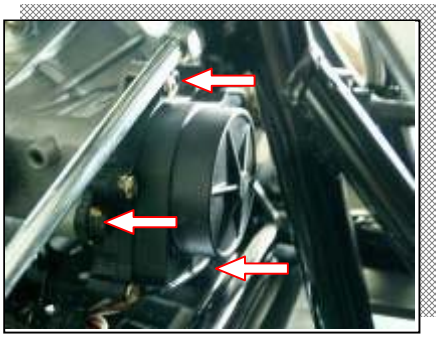
Multi-Circuit Tester Set
Tester knob indication: Voltage (DCV)



PIN / Position	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ
2WD	⊕	⊖			⊕	⊖		
4WD(UNLOCK)			⊕	⊖	⊕	⊖		
4WD-LOCK			⊕	⊖			⊕	⊖

- When installing the actuator assembly, tighten its bolts to the specified torque.

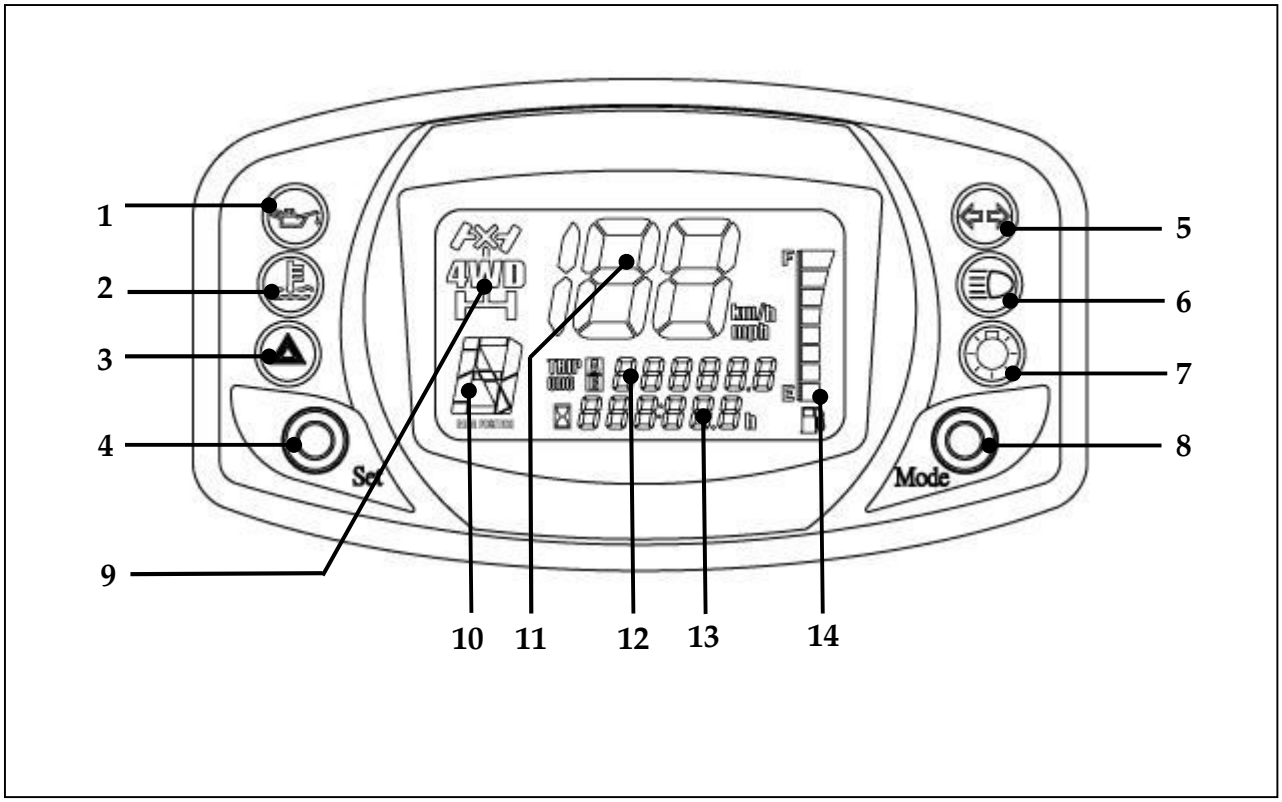
  Tightening Torque: 22 N-m (2.2 kgf-m, 15.9 lb-ft)



Combination Meter

Description

- This combination meter mainly consist of LCD (Liquid Crystal Display) and LED (Light Emitting Diode). This combination meter is light, thin and of high response compared to those currently in use because of this composition.



1	Engine Oil Indicator	**8**	Mode Button
2	Coolant Temperature Indicator	**9**	4WD/ Differential Lock Indicator
3	Hazard Light Indicator	**10**	Gear Position Indicator
4	Setting Button	**11**	Speedometer
5	Indicator Light	**12**	ODO/TRIP meter
6	High Beam Indicator	**13**	Clock/Hour/Temp/Tacho Meter
7	Position Light	**14**	Fuel Meter

Functions and Operating Procedure

Functions

1. Engine Oil indicator
   When engine oil level is low, this indicator lights up. When the ignition switch is turned on, it lights up until the engine starts.

2. Coolant Temperature Indicator
   This indicator lights up when the coolant temperature becomes high. When the main switch in "ON" if the light comes on automatically, you must stop the vehicle immediately and contact an authorized Dinli dealer.

3. Hazard Light Indicator
   This indicator lights up and blinks when the hazard light switch on the left handlebar assembly turns on. Front and rear indicators will blink simultaneously.

4. Setting Button
   Press button to switch the display of Clock/Hour/Tacho/Temp Meter.

5. Indicator Light
   When the indicator switch is operated, this indicator light will blink and the buzzer will sound.

6. High beam indicator light
   This indicator lights up when the light switch is switched to high beam and will go out when switched to low beam.

7. Position Light
   This light comes on when the ignition switch is turned on.

8. Mode button
   Press this button to switch the display between ODO/TRIP A/TRIP B Meter.

9. 4WD/ Differential Lock Indicator
   The instrument panel shows when the drive switch on the right handlebar is turned to 4WD. The differential lock indicator comes on when the drive switch is turned to 4WD Lock and the 4WD Lock "On" button is pressed.

10. Gear Position Indicator
    This shows the present gear and changes while shifting gears.

11. Speedometer

The speedometer shows approximate vehicle speed. To change between “mph” and “km/h”, press “Set” and “Mode” button simultaneously for more than 2 seconds. The display unit of ODO/TRIP meters changes at the same time.

12. ODO/TRIP meter

This display has two functions, odometer and 2 trip meters. Press “Mode” button to change the display.

- Odometer: The odometer registers the total distance which the vehicle has been ridden.
- Trip meter: The 2 Trip meter can be reset and recorded two kinds of distance. For example, Trip A can register the trip distance and Trip B can record the distance between adding fuels. Press more than 2 seconds to reset the Trip to “0”.

13. Clock/Hour/Tacho/Temp Meter

This display has four functions, Clock, Hour, Tacho and Temp meter. To change the display, press “Set” button shortly.

- Clock: Display the time in 12-hour. To set the clock, change to Clock mode and press “Set” button more than 2 seconds. The display starts to blink. Press “Mode” to change minute and hour. Press “Set” to adjust.
- Hour: The hour meter indicates the total time that the vehicle is used.
- Tacho Meter: Tacho meter displays the engine RPM.
- Temp: This shows the engine temperature.

14. Fuel Meter

The fuel meter shows the remaining amount of fuel in the fuel tank. It displays 8 segments when the fuel tank is full. The bottom segment blinks when the fuel level drops. Please add fuel when the fuel alert comes on.

Operating Procedure

Initial Display

- When the ignition switch is set to ON, all LCD light up for two seconds.

NOTE
○ Since the clock resets to “1:00”, it will need to be readjusted.

Change the Display Mode

● With each press of the MODE button, the display changes between odometer, trip meter A and trip meter B as shown.

● Hold down the MODE and setting button simultaneously for more than two seconds, the display changes between "mph" and "km/h", when displaying odometer as shown.

● With each press of the SET button, the display changes between clock, hour, tachometer and temperature.

⚠WARNING
To avoid riding with only one hand, do not operate the buttons while riding.

Odometer

● Displays the total distance travelled.

Trip meter

● Displays the distance travelled since the trip meter was last reset.

NOTE
The trip meters A and B can be used independently.

● Hold down the MODE button over two seconds to reset the trip meter

Clock

● Displays the time (hour and minutes) on a 12-hour-clock.

Setting the time

● Hold down the SET button over two seconds and then flashing the minute display.

○ Select the correct minute by pressing the MODE button.

● Decide the minutes by pressing the SET button, and then flashing the hour display.

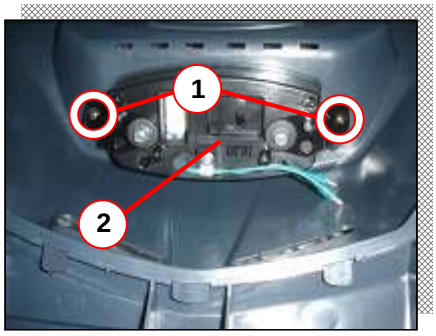
○ Select the correct hour by pressing the MODE button.

● Decide the hours by pressing the SET button.

Removal and Installation

● Remove the screws [1].

● Remove the combination meter [2].



CAUTION
○ When disconnecting and reconnecting the combination meter coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged. ○ Make sure that the speedometer coupler boots is positioned properly.

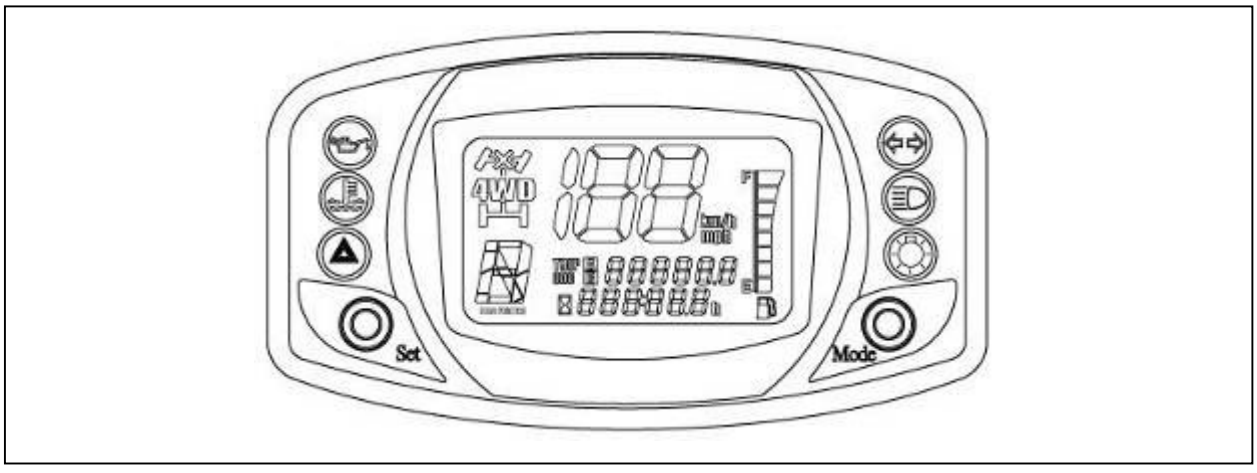
CAUTION
Do not attempt to disassemble the combination meter.

● Install the combination meter in the reverse order of removal.

Inspection

● Check that the LCD immediately after turning the ignition switch ON. Also check them for lighting in accordance with their switch positions.

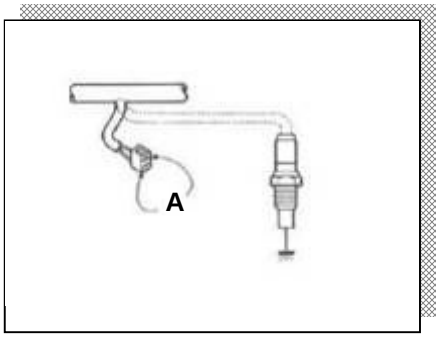
● If the LCD fails in operation, replace the combination meter unit with a new one after checking its wire harness/coupler.



Engine Coolant Temperature Meter and Indicator

● Disconnect the ECT sensor coupler [1].

CAUTION
When connecting and disconnecting the engine coolant temperature sensor lead wire coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.

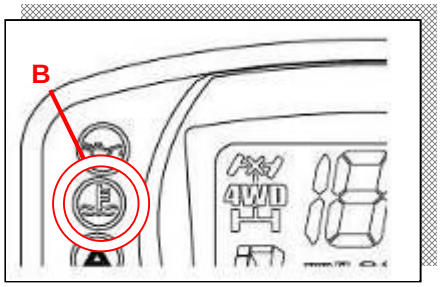


● Connect the variable resistor [A] between the terminals.

● Turn the ignition switch ON.

● Check the LED operations when the resistance is adjusted to the specified values.

Resistance [A]	LED [B]	Water temperature
Over 0.2 kΩ	OFF	Approx. 110℃
Approx. 0.11 kΩ	ON	120℃ and over



● If either one or all indications are abnormal, replace the combination meter with a new one.

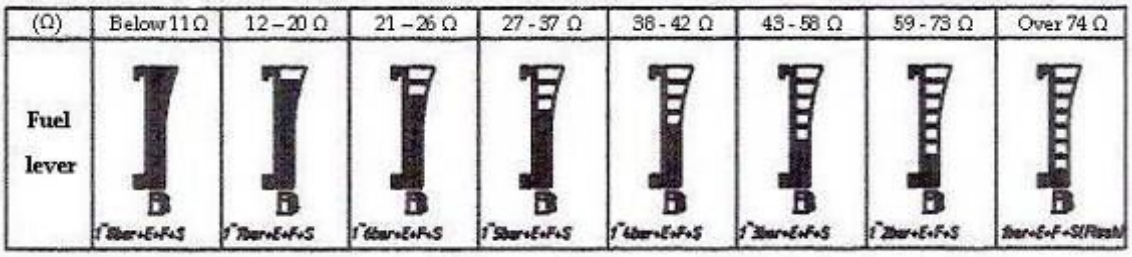
Fuel Meter

● Remove the rear fender.

● Connect each resistor between the terminals as shown.

● Turn the ignition switch “ON” position and wait for approx. 13 seconds.

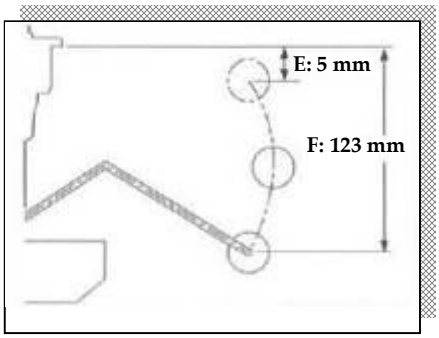
● Check the display of fuel meter as shown below, if any abnormal is found, replace the combination meter with a new one.



Fuel Gauge

- Measure the resistance at each fuel level gauge float position. If the resistance is incorrect, replace the carburetor with a new one.

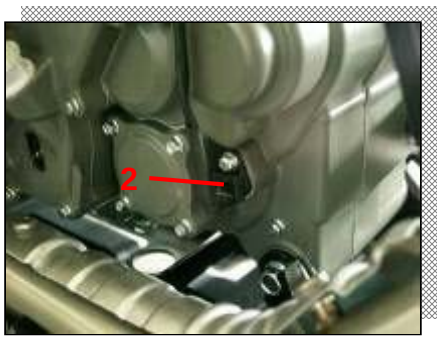
Float position	Resistance
"F" (Full)	Approx. 10Ω
"E" (Empty)	Approx. 90Ω



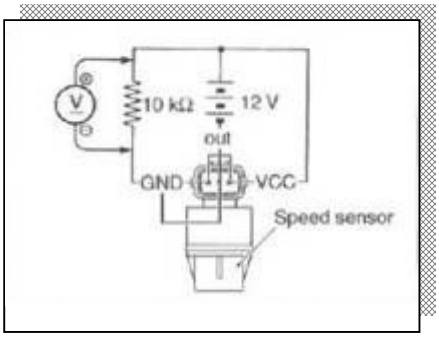
Multi-Circuit Tester Set
Tester knob indication: Resistance (Ω)

Speedometer

- If the speedometer, odometer or trip meter does not function properly, inspect the speed sensor and connection of coupler.
- If the speed sensor and connection are functioning properly, replace the speedometer with a new one.
- Remove the left mud guard.
- Disconnect speed sensor coupler [1].
- Remove the speed sensor [2] by removing its mounting bolt.
- Connect the 12 V battery, 10kΩ resistor and the multi-circuit tester as shown in the right illustration.

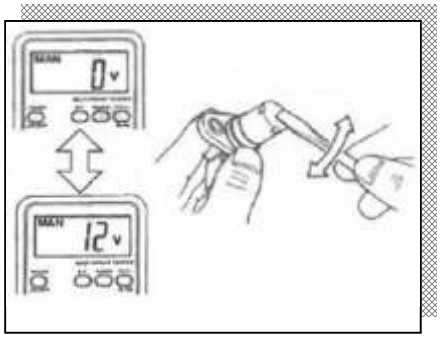


Multi-Circuit Tester Set
Tester knob indication: Voltage (DCV)



- Under above condition, if a suitable screwdriver touching the pick-up surface of the speed sensor is moved, the tester reading voltage changes (0 V to 12 V or 12V to 0V). If the tester reading voltage does not change, replace the speed sensor with a new one.

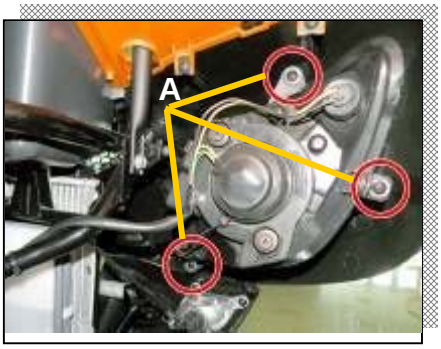
NOTE
The highest voltage reading in this test will be the same as that of battery (12 V).



Lighting System

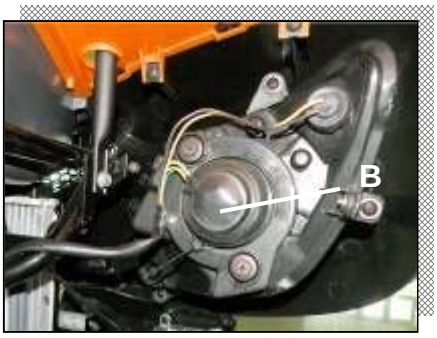
Headlight Bulb and Assembly Replacement

- Remove:
  Headlight Unit [A].
  Bulb Holder [B]



- Slide back the dust protection, and remove the bulb from the headlight unit.
- ○ Turn the holder counterclockwise and pull it out.
- Be sure the socket is clean.
- Insert the new bulb by aligning the tang with the notch in the headlight unit.

CAUTION
If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.



- Push the holder in, turn it clockwise, and release it, it should lock in position.
- Fit the dust cover completely.

Taillight Bulb and Assembly Replacement

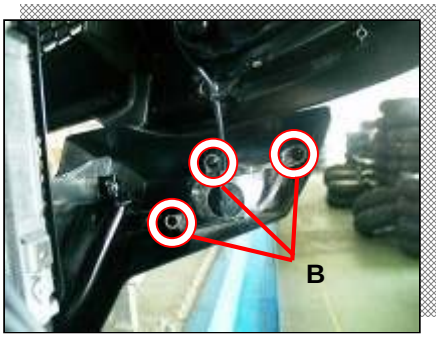
- Remove:
  Taillight Bracket Screw *3 [A]
  Taillight Unit

- Insert the new bulb

CAUTION
If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

Indicator Bulb and Assembly Replacement

- Remove:
  Indicator Screw [B]
- Insert the new bulb

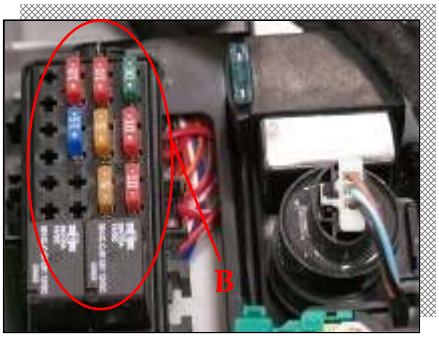


CAUTION
If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

Fuses

Main Fuse Removal

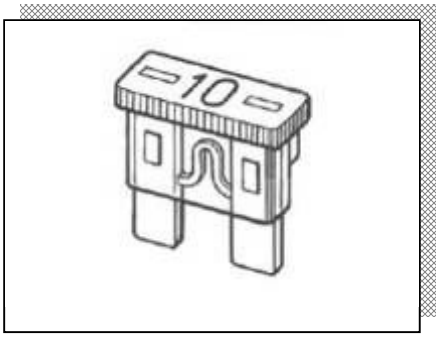
- Remove the seat (see Frame chapter)
- Remove the fuse case cap [A] and take out the fuse [B].



Fuse Inspection

- Inspect the fuse element.

★ If it is blown out, replace the fuse. Before replacing a blow fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

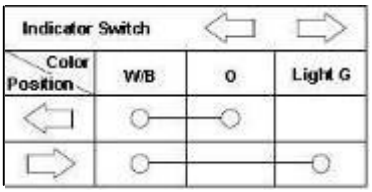


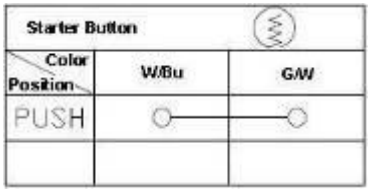
CAUTION
When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

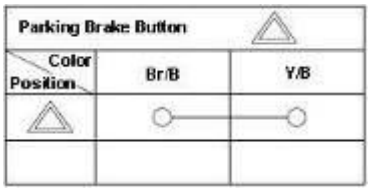
Switches

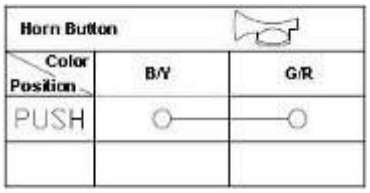
- Measure each switch for continuity using a multi-circuit tester. If any abnormality is found, replace the respective switch assemblies with new ones.

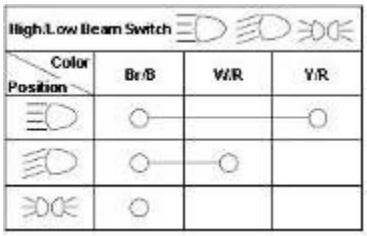
Multi-Circuit Tester Set

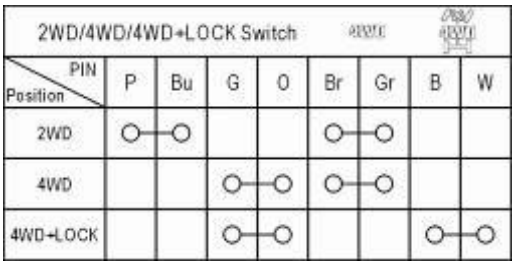








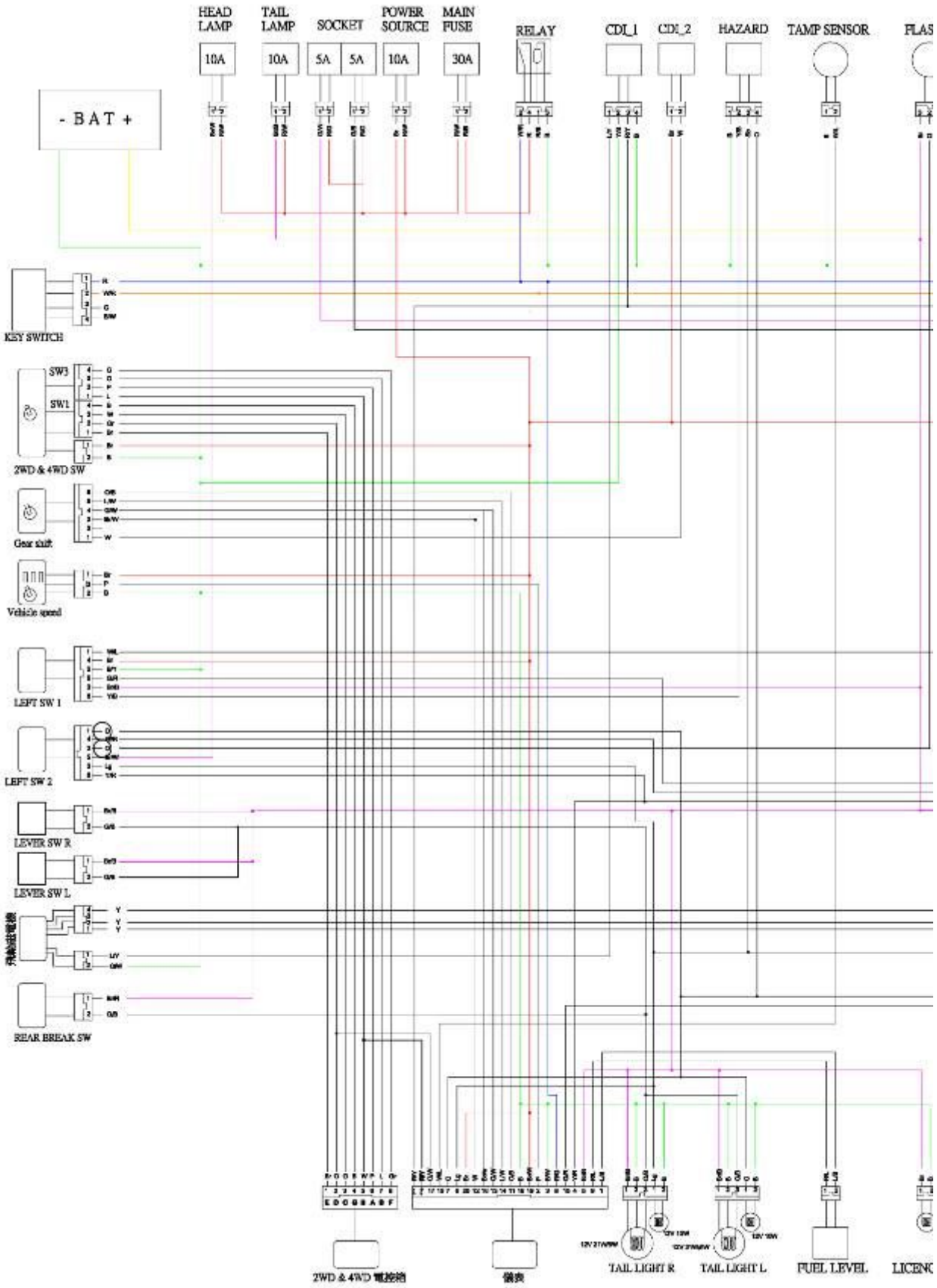




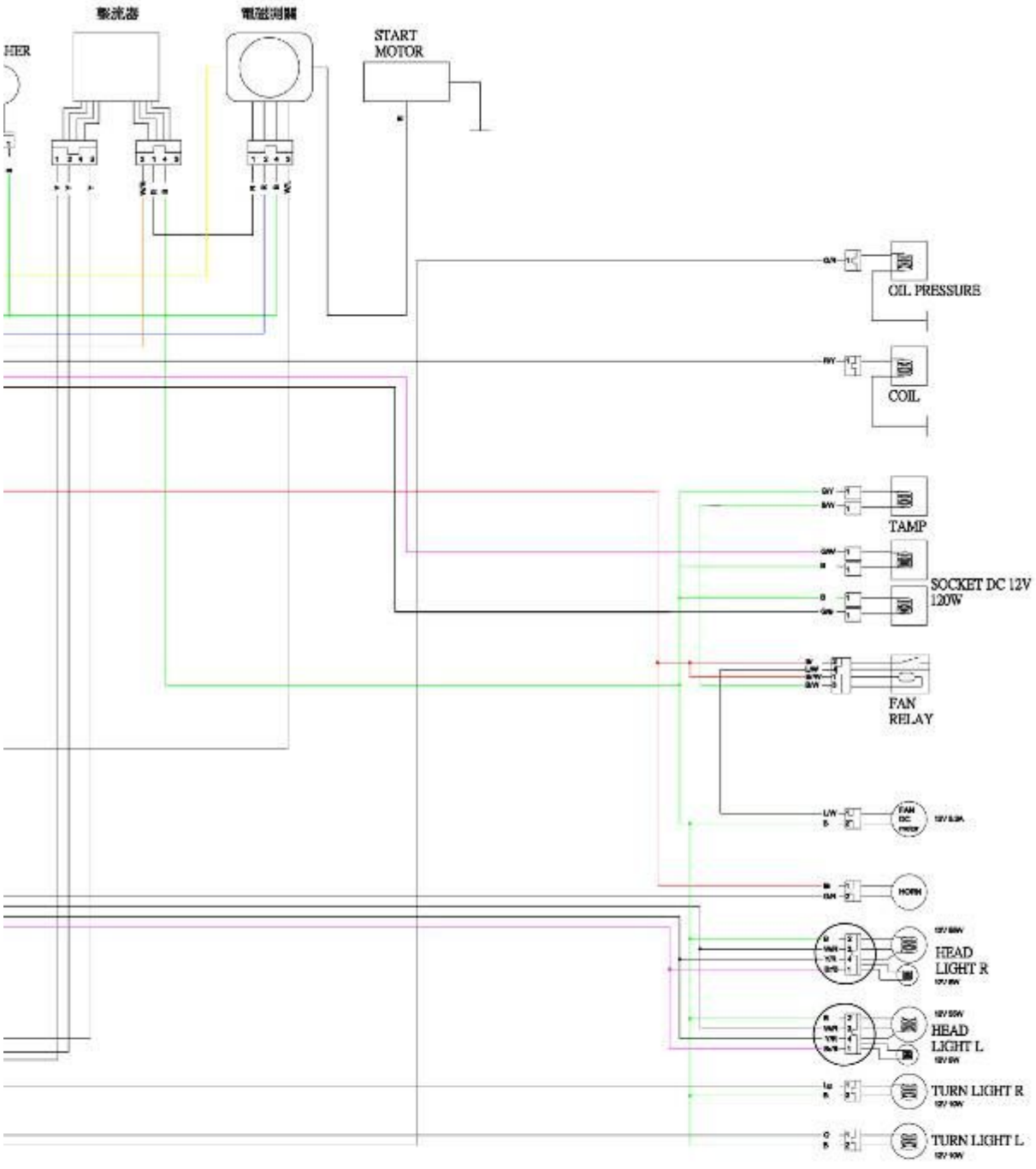
Wire Color

B: Black
Br: Brown
Bu: Blue
G: Green
Gr: Gray
Light G: Light Green
O: Orange
P: Pink
R: Red
W: White
B/Y: Black with Yellow tracer
Br/B: Brown with Black tracer
G/R: Green with Red tracer
G/W: Green with White tracer
W/B: White with Black tracer
W/Bu: White with Blue tracer
W/R: White with Red tracer
Y/B: Yellow with Black tracer
Y/R: Yellow with Red tracer

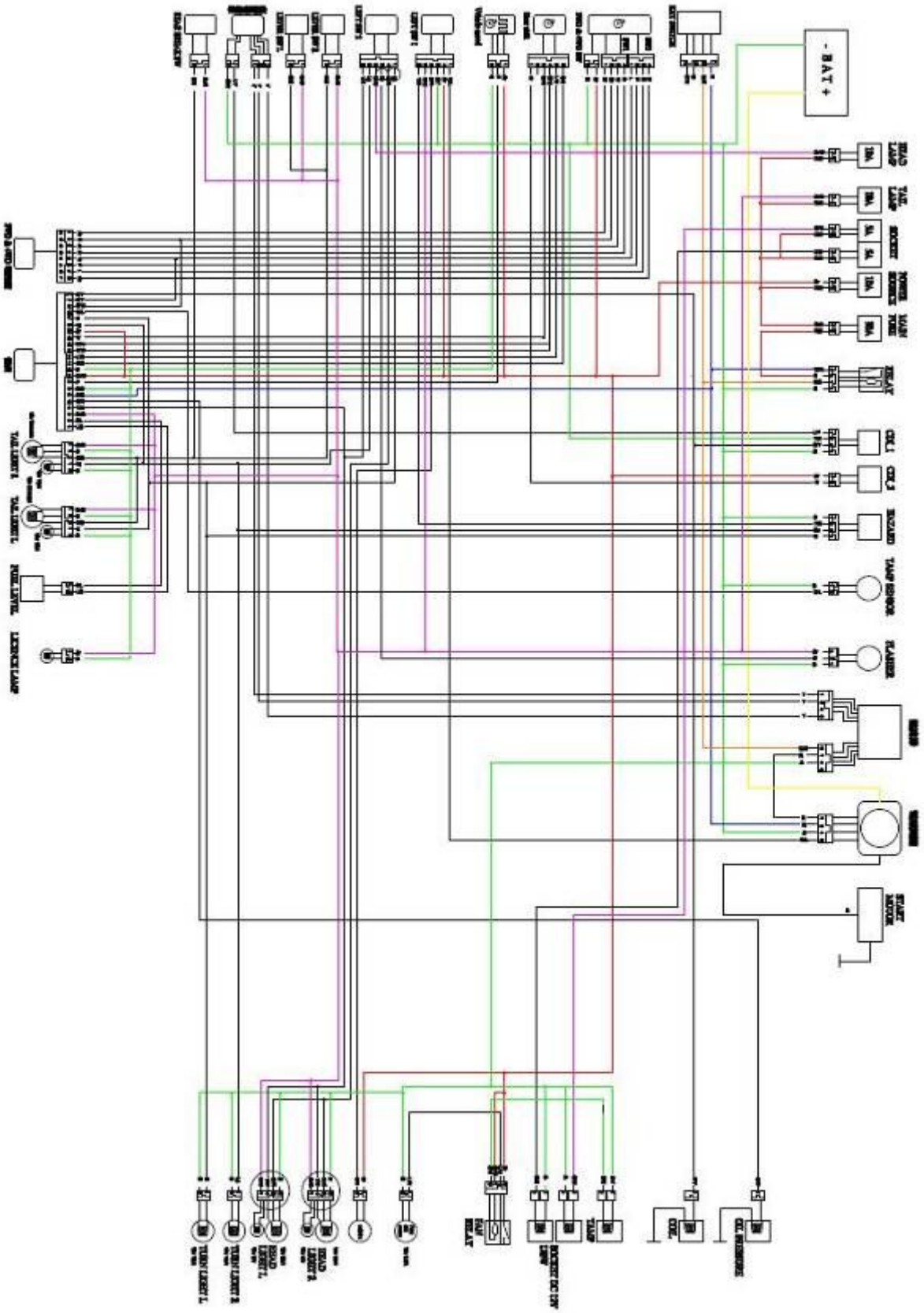
Wiring Diagram(Version I)



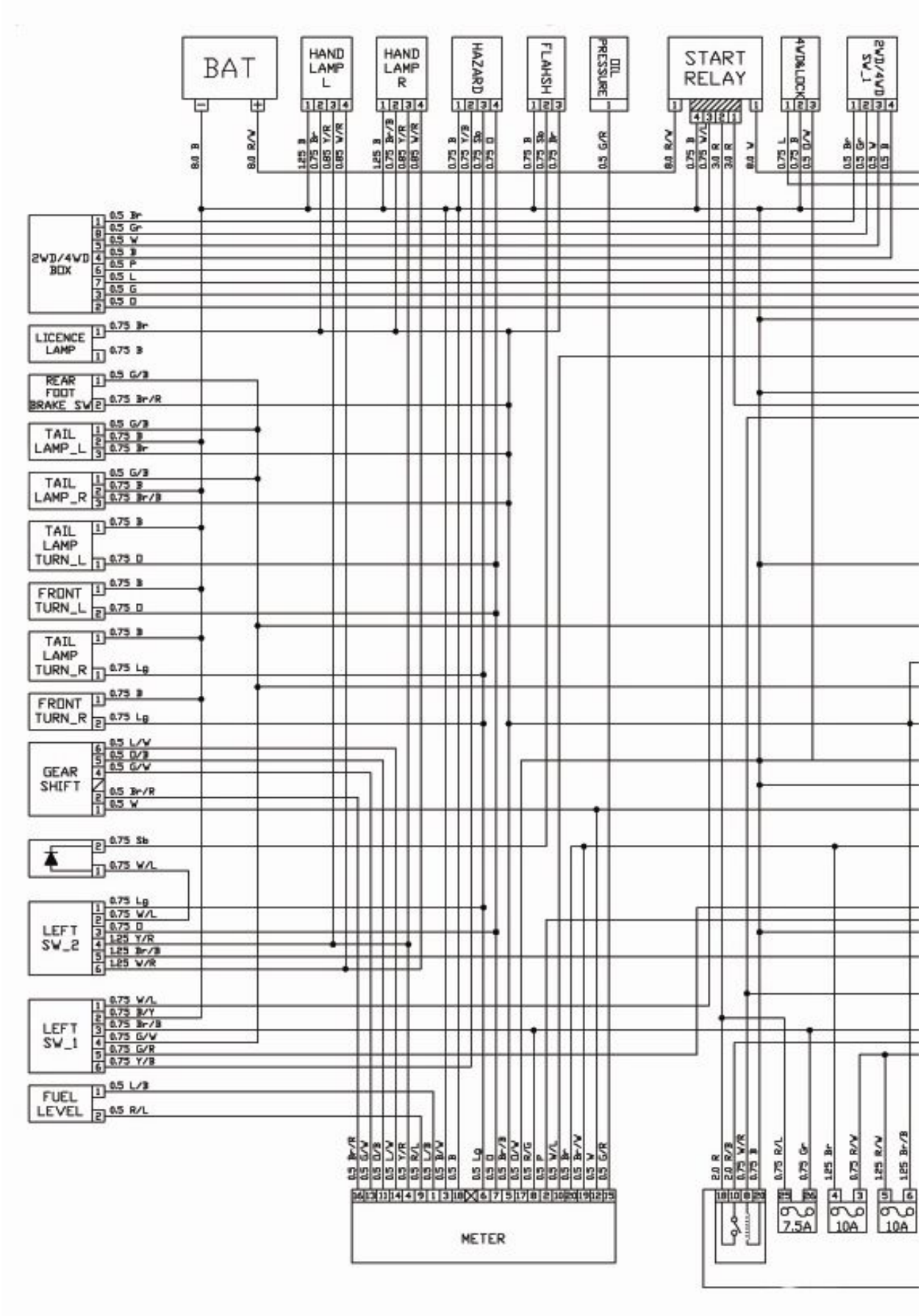
Wiring Diagram(Version I)



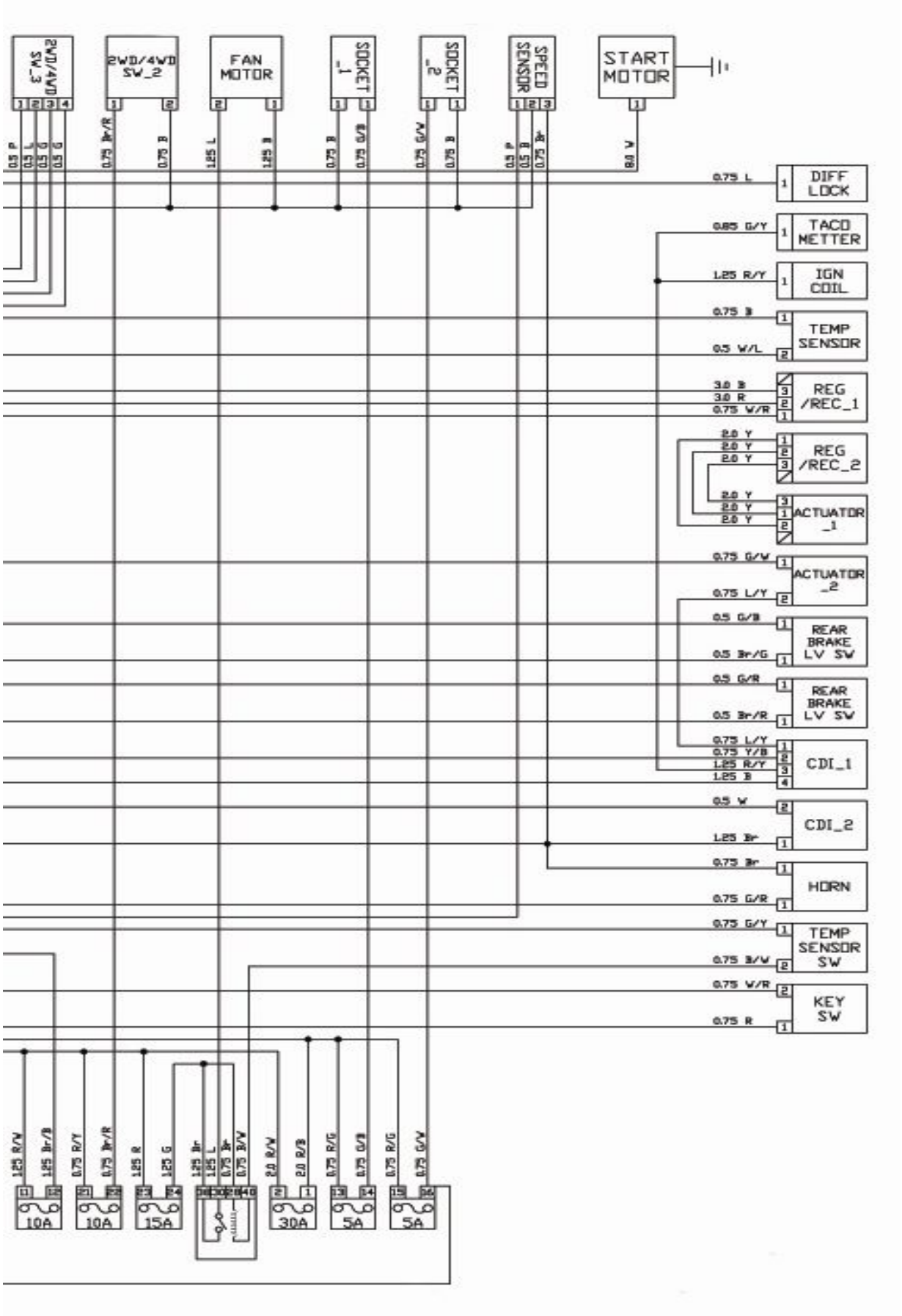
Wiring Diagram(Version I)



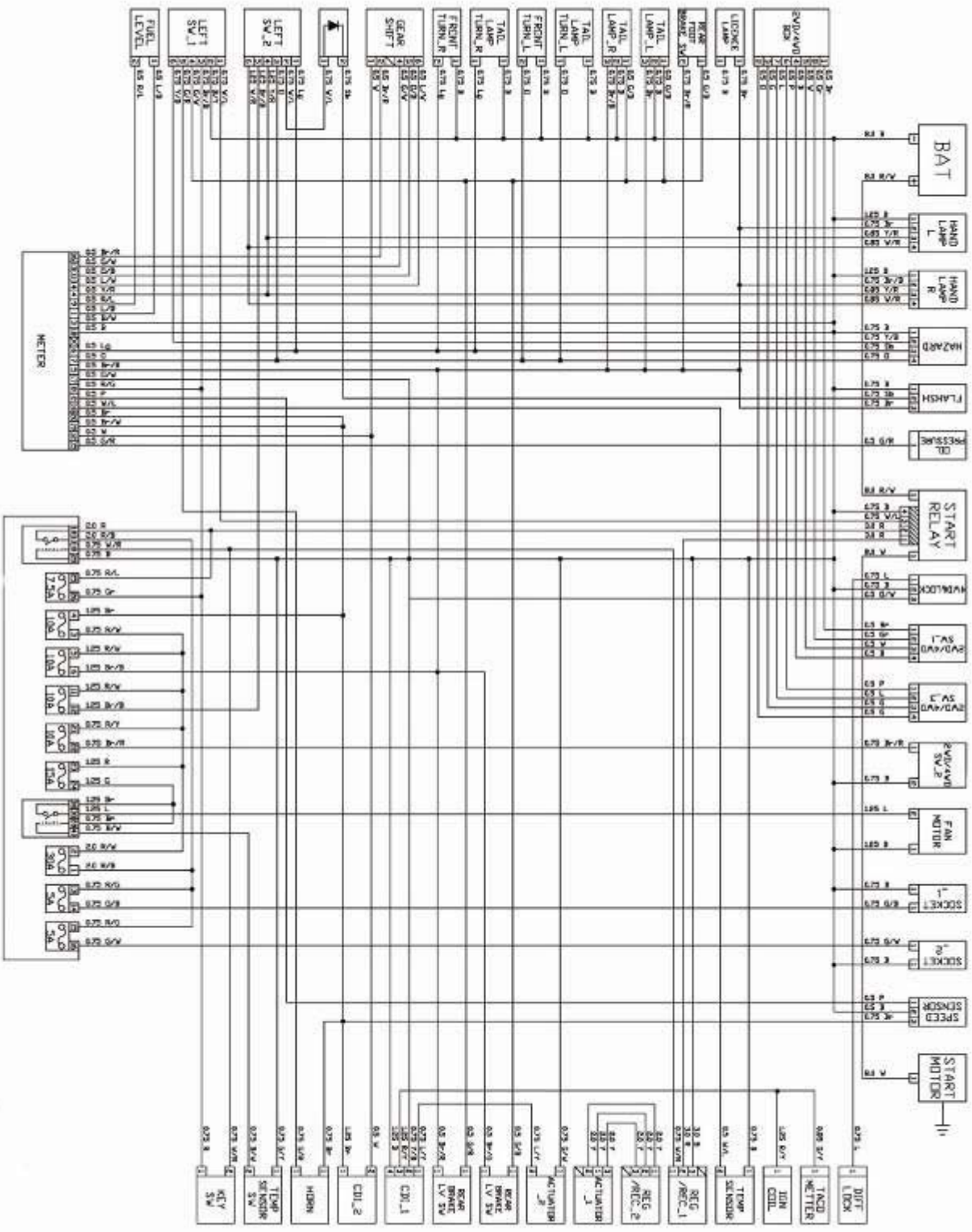
Wiring Diagram(Version II)



Wiring Diagram(Version II)



Wiring Diagram(Version II)



NOTE:

PERIODIC MAINTENANCE

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Periodic Maintenance Schedule

- The chart below lists the recommended intervals for all the required periodic service work necessary to keep the vehicle operating at peak performance and economy. Maintenance intervals are expressed in terms of kilometers, miles and months, and are dependent on whichever comes first.

NOTE
More frequent servicing may be performed on vehicles that are used under several conditions

Periodic Maintenance Chart

C=Clean
R=Replace
L=Lubricate
I=Inspect, Verify, Clean, Adjust, Lubricate, Replace if necessary

	Items / Interval: Day / Months	Regular Maintenance Internal					
		Break in	Initial week	Every 1 month	Every 3 month	Every 6 month	Note
	Hours	First hour	After 10 hours	Every 10	Every 50	Every 100	
	km	0	Initial 200	Every 200	Every 1000	Every 2000	
	WARNING LABELS (condition, readable)	I	I	I	I	I	I
	AIR CLEANER	I			C	C	★
	FRAME (mainframe, subframe)	I	I	I			
	FUEL LINE	I			I	I	Replace every four years
▲	THROTTLE OPERATION	I	I	I	I	I	
	SPARK PLUG					I	Replace every 6000 km
O	IDLE SPEED		I		I		
	ENGINE OIL	I	R			R	
▲	ENGINE OIL FILTER (s)	C	R			R	
	DIFFERENTIAL GEAR OIL					I	Replace every two years
	FINAL GEAR OIL					I	Replace every year
	COOLANT	I			I	I	Replace every two years
	SWITCHES (engine, stop, start, tether, ignition)	I			I		★
	BRAKE FLUID	I			I	I	Replace every two years
▲	BRAKE SYSTEM (cables, discs, pads, hoses, etc.)	I	I	I	I	I	★
	BRAKE DISCS	I	I		I	I	Replace every 10000 km
▲	LIGHTING (headlight, tail light, turning lights)	I		I			
	BATTERY (terminals)			I,C			
▲	EXHAUST (spark arrester)					C	
	SUSPENSION	I	I			I	
	NUTS, BOLTS AND FASTENERS		I	I	I	I	
▲	WHEELS / TIRES (pressure, condition, wear)	I			I	I	
▲	STEERING ASSEMBLY (fasteners, operation)	I		I	I	I	★
	GENERAL LUBRICATION	L			L	L	

▲ DINLI dealer service suggested servicing owners should have the proper tools, service data, and be mechanically qualified.
O Operational safety involved. The service should be performed by a DINLI dealer.
★ Service more frequently if operation in dusty, sandy or snowy area or conditions.

Maintenance and Tune-Up Procedures

● this section describes the servicing procedures for the items mentioned in the periodic maintenance chart or the other important parts that may influence the engine performance.

● Before performing the servicing procedures mentioned in the periodic maintenance chart, remove following parts to ease servicing work.

○ seat.

○ Front rack.

○ Rear rack.

○ Front fender.

○ Rear fender.

○ Left footboard.

○ Right footboard.

Air cleaner

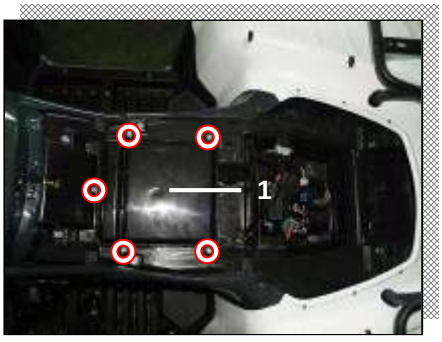
Clean every 1000 km (50 hours, 3 months).

● If the air cleaner element is clogged with dust, intake resistance will be increased, which results decrease in power output and increase in fuel consumption. Check and clean the air cleaner element in the following manner.

○ Remove the seat.

○ Remove the air cleaner cover [1].

○ Remove the air cleaner.



● Using warm water, wash away the dust from the cleaner element and replace the foam with a new one.

● If the element is too dirty to clean, replace the whole cleaner with a new one.

● Reinstall the cleaned or new air cleaner in the reverse order of removal.

CAUTION
In driving under dusty conditions, clean the air cleaner element more frequently. The surest way to accelerate engine wear is to operate the engine without the element or to use a worn element. Make sure that the air cleaner is in good condition at all times. The life of the engine depends largely on this component!

● Remove the drain plug [2] from the air cleaner drain hose and air cleaner box to allow any water to drain out.

Exhaust Pipe Nuts and Muffler Mounting Bolts

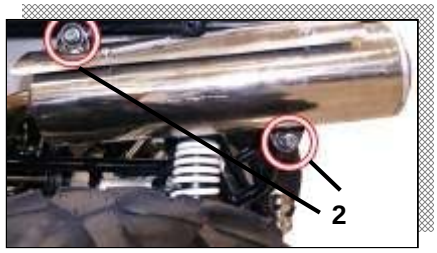
● Tighten the exhaust pipe nuts [1], muffler mounting bolts [2] and the muffler assembly connected bolt [3] to the specified torque.

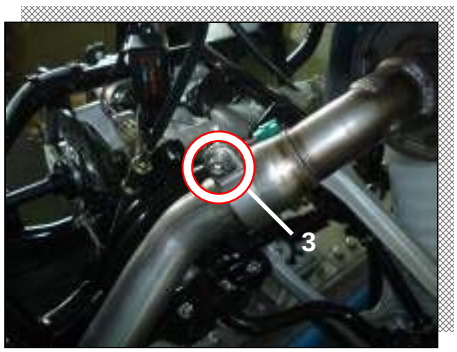
Tightening Torque:

Exhaust Pipe Nut: **23 N-m (2.3 kgf-m, 16.5 lb-ft)**

Muffler mounting bolt: **23 N-m (2.3 kgf-m, 16.5 lb-ft)**

Muffler assembly connected bolt: 23 N-m (2.3 kgf-m, 16.5 lb-ft)

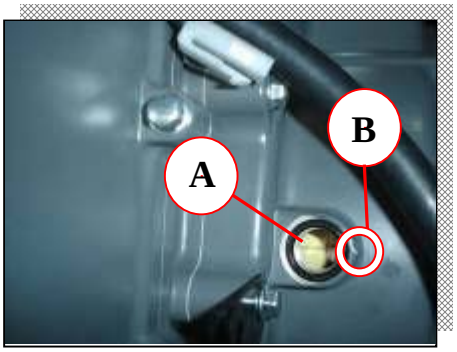




Valve Clearance

- Excessive valve clearance results in valve noise and insufficient valve clearance results in valve damage and reduced power.
- Check the intake and exhaust valve clearances at the interval indicated above and adjust the valve clearances to specification, if necessary.
- Remove the front fender.
- Remove the cylinder head cover.
- Remove the recoil starter [1].
- Remove the valve timing inspection plug [2].

- Turn the crankshaft to bring the "TDC" line [A] on the starter clutch to the flange [B].

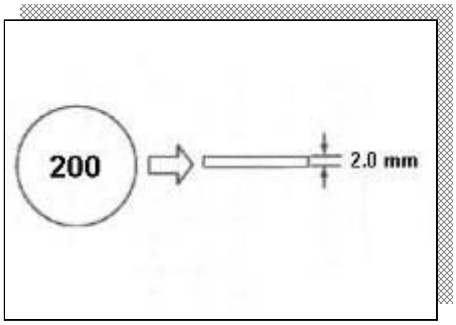


- Read the valve clearance at all the valves with the special tool
- If the clearance is out of specification, adjust the clearance.

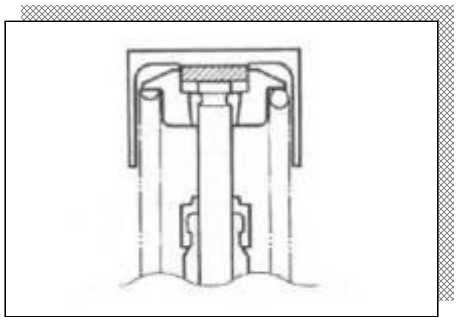
Thickness Gauge

Valve Clearance (When cold)	
IN	0.1 – 0.2 mm
EX	0.2 – 0.3 mm

Valve Clearance Adjustment



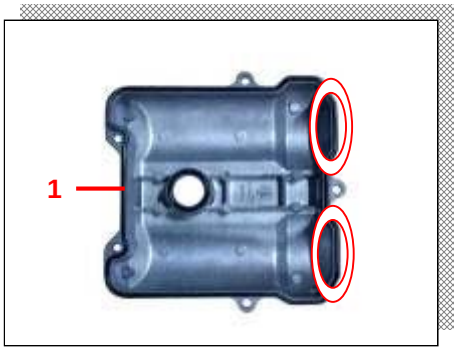
- The clearance is adjusted by replacing the existing tappet shim by a thicker or thinner one.
- Remove the intake or exhaust camshaft. (See Engine Chapter)
- Remove the tappet and shim by fingers or magnetic hand.
- Check the figures printed on the shim. These figures indicate the thickness of the shim, as illustrated.
- Select a replacement shim that will provide a clearance within the specified range. For the purpose of this adjustment, a total of 21 sizes of tappet shim are available ranging from 2.50 to 3.50 mm in steps of 0.05 mm. Fit the selected shim to the valve stem end, with numbers towards tappet. Be sure to check shim size with micrometer to ensure its size. Refer to the tappet shim selection table for details in the following pages.



NOTE
○ Be sure to apply engine oil to tappet shim top and bottom faces. ○ When seating the tappet shim, be sure the figure printed surface faces the tappet.

NOTE
Reinstall the camshafts in the specified manner. (See Engine Chapter)

- After replacing the tappet shim and camshafts, rotate the engine so that the tappet is depressed fully. This will squeeze out oil trapped between the shim and the tappet that could cause an incorrect measurement. Then check the clearance again to confirm that it is within the specified range.
- Install the new gasket [1] to the cylinder head cover.
- Apply BOND to the cam end caps of the gasket as shown.



CAUTION
Use the new gasket to prevent oil leakage.

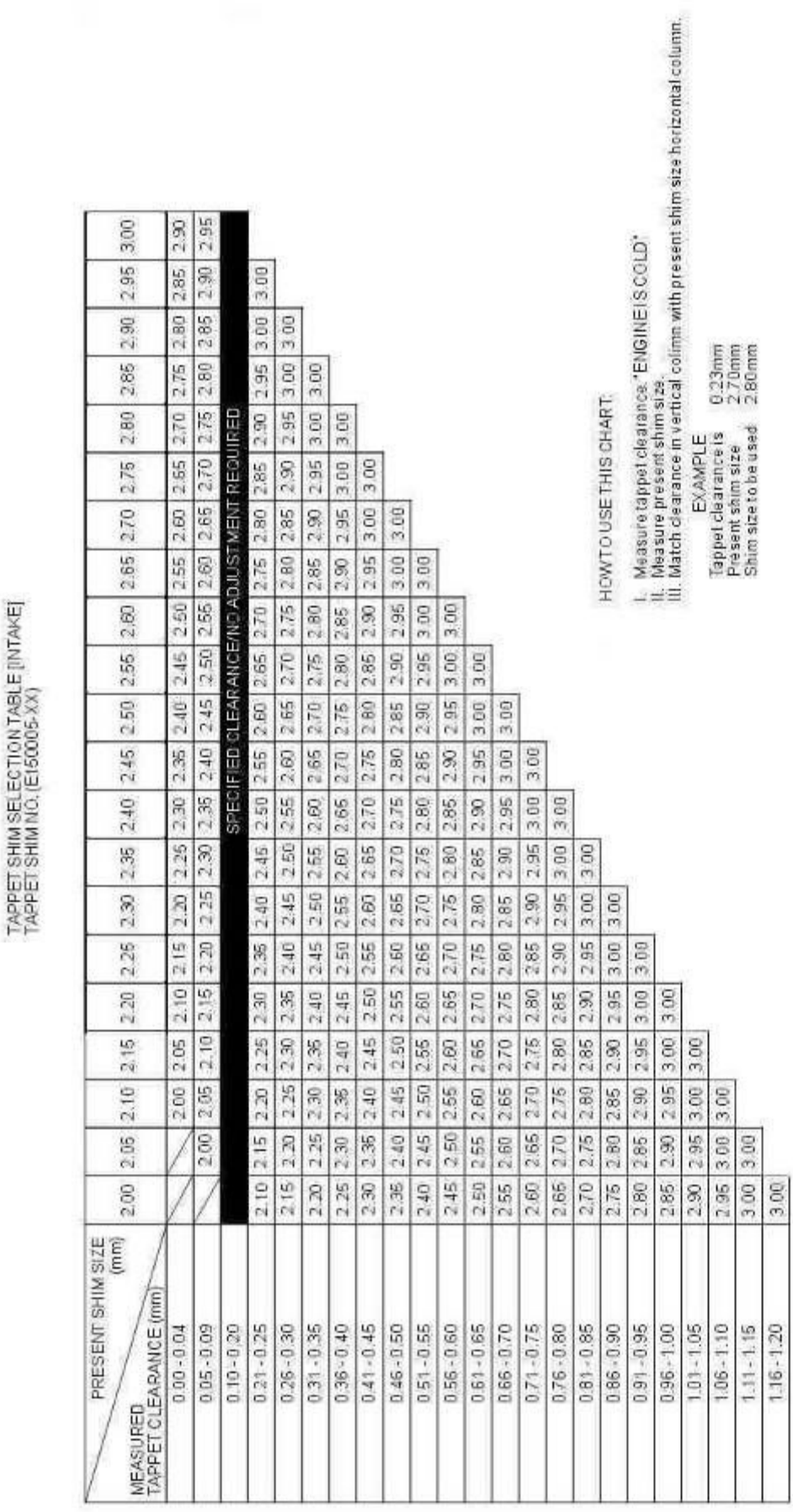
- Tighten the head cover bolts to the specified two-step torque sequentially and diagonally.

Tightening Torque: Initial 10 N-m

Final 14 N-m

NOTE
Apply engine oil to the both side of head cover washer before installing the head cover bolts.

(Intake Side)



TAPPET SHIM SELECTION TABLE [INTAKE]
TAPPET SHIM NO. (EI50005-XX)

MEASURED TAPPET CLEARANCE (mm) \ PRESENT SHIM SIZE (mm)	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00
0.00 - 0.04	/	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95
0.05 - 0.09	/	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00
0.10 - 0.20	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																				
0.21 - 0.25	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00	
0.26 - 0.30	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00		
0.31 - 0.35	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00			
0.36 - 0.40	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00				
0.41 - 0.45	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00					
0.46 - 0.50	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00						
0.51 - 0.55	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00							
0.56 - 0.60	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00								
0.61 - 0.65	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00									
0.66 - 0.70	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00										
0.71 - 0.75	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00											
0.76 - 0.80	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00												
0.81 - 0.85	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00													
0.86 - 0.90	2.75	2.80	2.85	2.90	2.95	3.00	3.00														
0.91 - 0.95	2.80	2.85	2.90	2.95	3.00	3.00															
0.96 - 1.00	2.85	2.90	2.95	3.00	3.00																
1.01 - 1.05	2.90	2.95	3.00	3.00																	
1.06 - 1.10	2.95	3.00	3.00																		
1.11 - 1.15	3.00	3.00																			
1.16 - 1.20	3.00																				

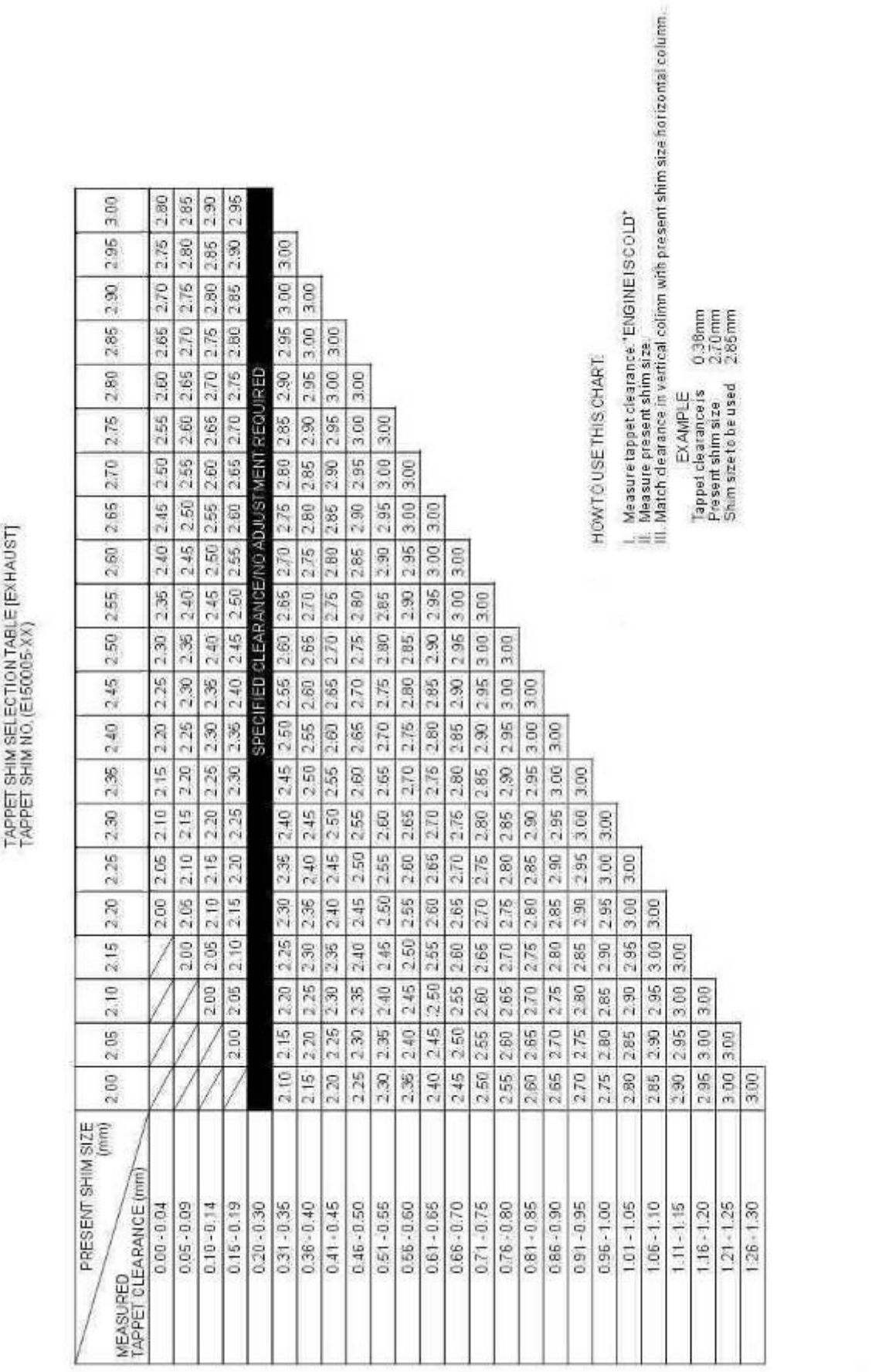
HOW TO USE THIS CHART:

I. Measure tappet clearance, "ENGINE IS COLD"
II. Measure present shim size.
III. Match clearance in vertical colimn with present shim size horizontal column.

EXAMPLE

Tappet clearance is	0.23mm
Present shim size	2.70mm
Shim size to be used	2.80mm

(Exhaust Side)



TAPPET SHIM SELECTION TABLE [EXHAUST]
TAPPET SHIM NO. (E150005-XX)

MEASURED TAPPET CLEARANCE (mm) \ PRESENT SHIM SIZE (mm)	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00
0.00 - 0.04	/	/	/	/	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80
0.05 - 0.09	/	/	/	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85
0.10 - 0.14	/	/	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90
0.15 - 0.19	/	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95
0.20 - 0.30	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																				
0.31 - 0.35	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00	
0.36 - 0.40	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00		
0.41 - 0.45	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00			
0.46 - 0.50	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00				
0.51 - 0.55	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00					
0.56 - 0.60	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00						
0.61 - 0.65	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00							
0.66 - 0.70	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00								
0.71 - 0.75	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00									
0.76 - 0.80	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00										
0.81 - 0.85	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00											
0.86 - 0.90	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00												
0.91 - 0.95	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.00													
0.96 - 1.00	2.75	2.80	2.85	2.90	2.95	3.00	3.00														
1.01 - 1.05	2.80	2.85	2.90	2.95	3.00	3.00															
1.06 - 1.10	2.85	2.90	2.95	3.00	3.00																
1.11 - 1.15	2.90	2.95	3.00	3.00																	
1.16 - 1.20	2.95	3.00	3.00																		
1.21 - 1.25	3.00	3.00																			
1.26 - 1.30	3.00																				

HOW TO USE THIS CHART:

I. Measure tappet clearance "ENGINE IS COLD"
II. Measure present shim size.
III. Match clearance in vertical colimn with present shim size horizontal column.

EXAMPLE

Tappet clearance is	0.38mm
Present shim size	2.70mm
Shim size to be used	2.85mm

Spark Plug

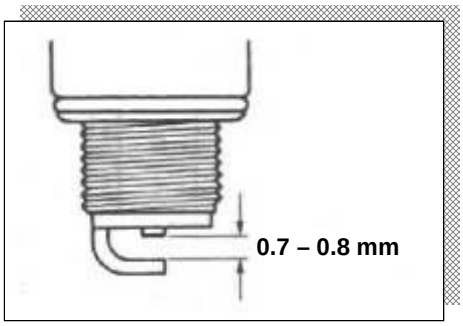
Inspect every 2000 km (100 hours, 6 months). Replace every 6000km.

- Remove the front fender.
- Disconnect the high voltage cable [1] and remove the spark plug

	Standard	Cold Type
NGK	CR6E	CR7E

- Check to see if there are carbon deposits on the spark plug. If carbon is deposited, remove it with a spark plug cleaner machine or carefully use a tool with a pointed end.

- Measure the spark plug gap with a thickness gauge. If the spark plug gap is out of specification, adjust the gap.



Spark Plug Gap	
Standard	0.7 – 0.8 mm

Wire Gauge

- Check the condition of the electrode.
- If the electrode is extremely worn or burnt, replace the spark plug with a new one.
- Also, replace the spark plug if it has a broken insulator, damaged threads, etc.

CAUTION
Check the thread size and reach when replacing the spark plug. If the reach is too short, carbon will be deposited on the screw portion of the spark plug hole and engine damage may result.

CAUTION
To avoid damaging the cylinder head threads; first, tighten the spark plug by hand, and then tighten it to the specified torque using the spark plug wrench.

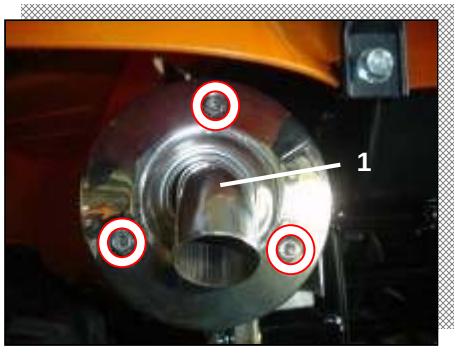
- Insert the spark plug and tighten it to the cylinder head by hand and then tighten it to the specified torque.

Tightening Torque: 14 N-m (1.4 kgf-m, 10.1 lb-ft)

Spark Arrester

Clean every 2000 km (100 hours, 6 months).

- Remove the muffler end cover [1].
- Extract the spark arrester pipe [2] from the muffler.
- Clean the spark arrester pipe [2] by non-synthetic brush, If necessary, blow debris from the arrester with compressed air.
- Reinstall the spark arrester pipe [2].



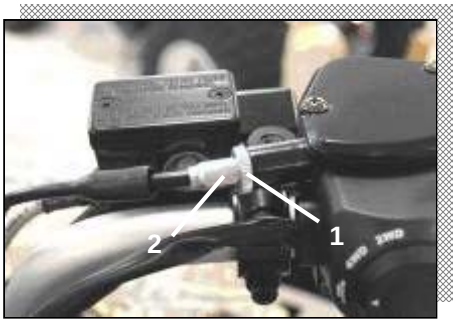
Fuel Line

Inspect every 1000 km (50 hours, 3 months).
Replace every four years.

- Inspect the fuel feed hose for damage and fuel leakage. If any damages are found, replace it with a new one.

Throttle Cable Play

Inspect initially at 200 km (10 hours, 1 month) and every 200 km (10 hours, 1 month) thereafter.



● Adjust the throttle cable play.

○ Loosen the locknut [1] of the throttle cable.

○ Turn the adjuster [2] in or out to obtain the correct play.

Throttle Cable Play [3]	
Standard	3 – 8 mm

○ After adjusting the throttle cable play, tighten the locknut [1].

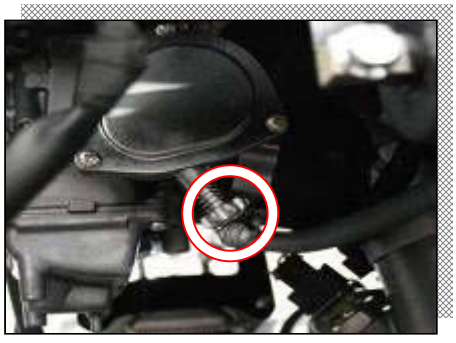
Carburetor

Inspect every 1000 km (50 hours, 3 months) and every 2000 km (100 hours, 6 months) thereafter.

● Inspect the carburetor for dirt or mud.

● If any dirt or mud is found, clean it.

Idle Adjustment

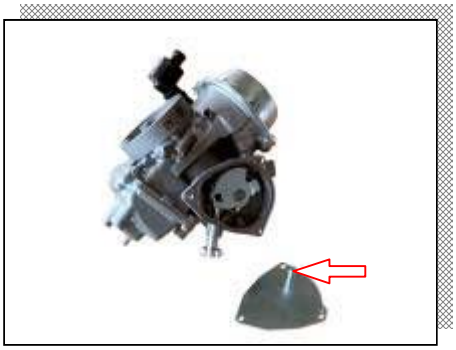


● To adjust the idle, allow the engine to reach operating temperature 70℃ (158℉).

● Adjust the idle speed to maintain at 1300 rpm, turning the adjuster clockwise to increase idle speed, or counterclockwise to decrease idle speed.

Carburetor Limiting Device

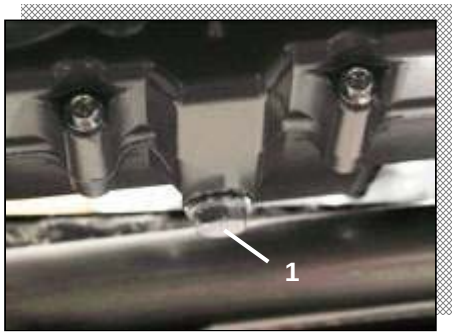
CAUTION
The carburetor has a limiting device which has limit the horsepower of the engine to prevent damage.



Engine Oil and Oil Filter

Replace initially at 200 km (10 hours, 1 month) and every 2000 km (100 hours, 6 months) thereafter.

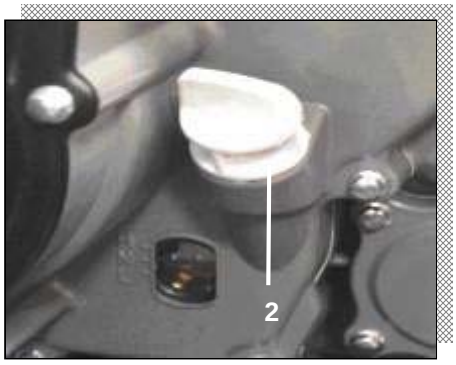
- The oil should be changed while the engine is warm. Oil filter replacement at the above intervals should be done together with the engine oil change.



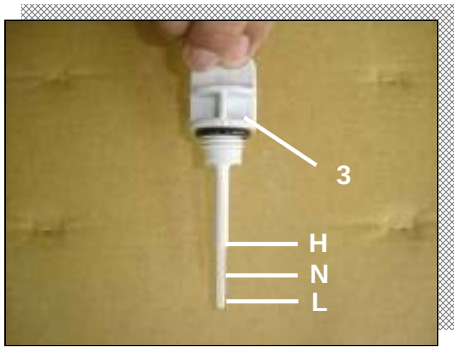
Engine Oil Replacement

- Place an oil pan under the drain plug [1], and then drain out the engine oil by removing the engine oil drain plug [1] and engine oil filler cap [2].
- Tighten the drain plug, with the new washer, to the specified torque, and then pour the new oil through the oil filler hole.

  Tightening Torque: 19 N-m (1.9 kgf-m, 14.0 lb-ft)

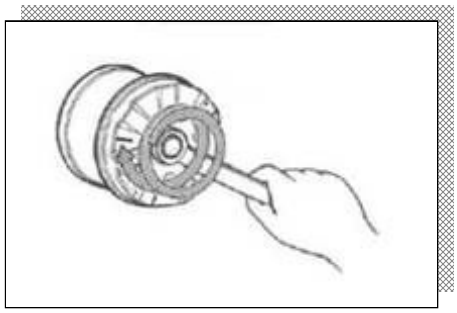


- When performing an oil change, the engine will hold about 3.3 L of oil. Use engine oil that meets the API service classifications SF or SG and that has a viscosity rating of SAE 10W/40.
- Tighten the oil filler cap [2].
- Start the engine and allow it to run for a few minutes at idling speed.
- Turn off the engine and wait about three minutes, and then check the oil level on the dipstick [3]. If the level is below upper line, add oil to that level. The vehicle must be placed on level ground for accurate measurement.



Oil Filter Replacement

- Drain the engine oil.
- Remove the front fender.
- Remove the oil filter [1] with the special tool.
- Apply engine oil lightly to the gasket of the new oil filter, before installation



- Install the new oil filter to the engine. Turn it by hand until you feel that the oil filter gasket has contacted the oil filter mounting surface. Then, tighten the oil filter two full turns with the special tool.

D003-Oil Filter Wrench

NOTE
To properly tighten the oil filter, use the special. Never tighten the oil filter by hand.

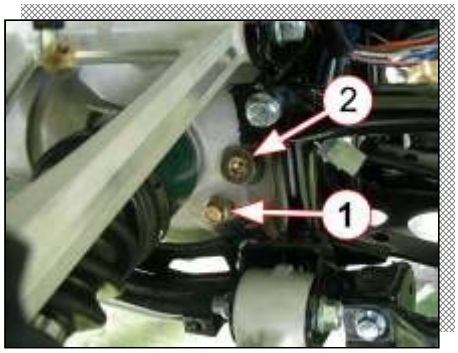
- Pour the new engine oil through the oil filler hole. When performing the oil filter change, the engine will hold about 3.3 L of oil
- Check the oil level.
- Add new engine oil and check the oil level.

Engine Oil Capacity	
Oil change	3.3 L
Engine overhaul	3.5 L

CAUTION
ONLY USE A DINLI OIL FILTER. Other manufacture's oil filters may differ in thread specifications (thread diameter and pitch), filtering performance and durability which may lead to engine damage or oil leaks.

Differential Gear Oil Inspection

Inspect every 2000 km (100 hours, 6 months). **Replace every two years.**



- Place the vehicle on level ground.
- Remove the oil level plug [1] and oil filler plug [2], and inspect the oil level. If the oil level is below the level hole, add fresh oil until oil flows from the level hole.
- Tighten the oil level plug [1] and oil filter plug [2] to the specified torque.

Differential Gear Oil Replacement

- Place the vehicle on level ground.
- Remove the front under protector. (See Body chapter)
- Place an oil pan below the differential gear case.
- Drain oil by removing the oil drain plug [3], oil filler plug [2] and oil level plug [1].
- Tighten the oil drain plug [3] to the specified torque and pour fresh oil through the oil filter hole until it overflows from the oil level hole.
- Tighten the oil level plug [1] and oil filler plug [2] to the specified torque.
- Install the front under protector.

Differential Gear Oil Specification:

Hypoid gear oil SAE#80W-90, API grade GL-5

NOTE
Use hypoid gear oil SAE#80, API grade GL-5, if the vehicle is ridden where the ambient temperature is below 0℃ (32℉)

Front differential gear oil capacity: 150 ml

Tightening Torque:

Front differential gear oil level plug :
9 N-m (0.9 kgf-m, 6.5 ft-lb)

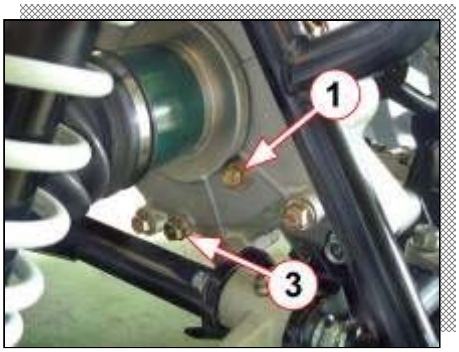
Front differential gear oil drain plug :
32 N-m (3.2 kgf-m, 23.0 ft-lb)

Front differential gear oil filler plug :
35 N-m (3.5 kgf-m, 25.5 ft-lb)

Rear Driver Gear Oil

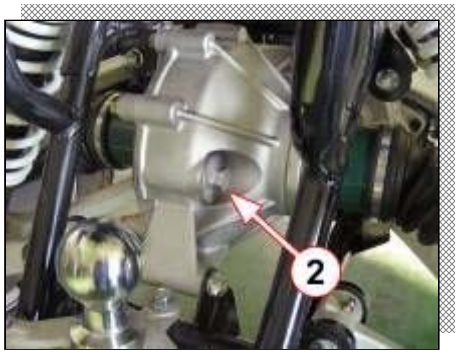
Inspect every 2000 km (100 hours, 6 months).
Replace every year.

Rear Driver Gear Oil Inspection



- Place the vehicle on level ground.
- Remove the oil level plug [1] and oil filler plug [2], and inspect the oil level. If the oil level is below the level hole, add fresh oil until oil flows from the level hole.
- Tighten the oil level plug [1] and oil filler plug [2] to the specified torque.

Rear Driver Gear Oil Replacement



- Place the vehicle on level ground.
- Remove the rear under protector. (See Body chapter)
- Place an oil pan below the rear driver gear case.
- Drain oil by removing the oil drain plug [3], oil filler plug [2] and oil level plug [1].
- Tighten the oil drain plug [3] to the specified torque and pour fresh oil through the oil filter hole until it overflows from the oil level hole.

  Tightening Torque: 23 N-m (2.3 kgf-m, 16.5 lb-ft)
- Tighten both the oil level plug [1] and oil filler plug [2] to the specified torque.

  Oil level plug: 23 N-m (2.3 kgf-m, 16.5 lb-ft)

  Oil filter plug: 23 N-m (2.3 kgf-m, 16.5 lb-ft)
- Install the front under protector.

Rear driver gear oil capacity: 310 ml

Rear driver gear oil specification:

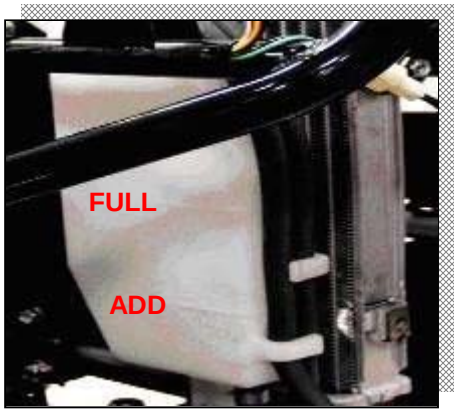
Hypoid gear oil SAE#80W-90, API grade GL-5

Engine Coolant

Inspect every 1000 km (50 hours, 3 months).
Replace every two years.

Engine Coolant Level Check

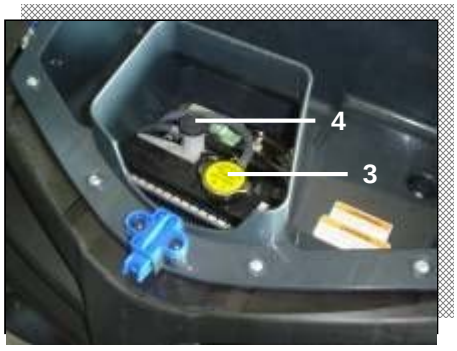
- Check the engine coolant level by observing the upper and lower lines on the engine coolant reservoir tank.
- If the level is below the lower line, add engine coolant until the level reaches the upper line.

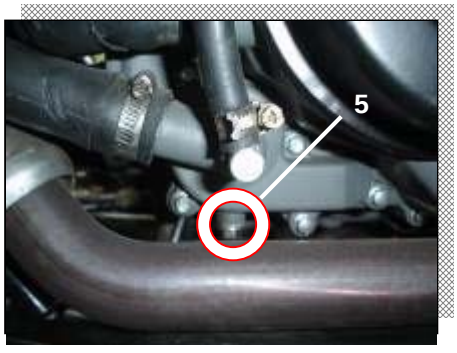


Engine Coolant Replacement

- Remove the front fender decoration [1] by inserting the opening stick [2] into the hole to open it.
- Remove the radiator cap [3] and engine coolant reservoir tank cap [4].
- Remove the left footboard.
- Place a pan below the water pump, and then drain the engine coolant by removing the drain plug [5].

⚠ WARNING
○ Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor. ○ Engine coolant may be harmful if swallowed or if it comes in contact with the skin or eyes. If engine coolant gets into the eyes or contacts the skin, flush the eyes or wash the skin thoroughly, with plenty of water. If engine coolant is swallowed, induce vomiting and call a physician immediately.





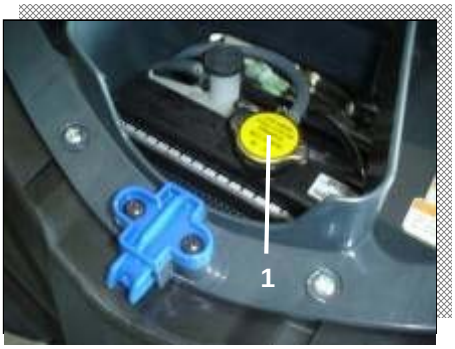
- Flush the radiator with fresh water, if necessary.
- Tighten the drain plug [5] to the specified torque.

  Tightening Torque: 13 N-m (1.3 kgf-m, 9.5 lb-ft)
- Pour the specified engine coolant into the reservoir tank.

CAUTION
Use and antifreeze designed for aluminum radiators mixed with distilled water only. Water/antifreeze mixture ratio 50:50 – 33:67

NOTE
For engine coolant information, refer to page 7-2.

- Install the radiator cap [1] securely.
- After warming up and cooling down the engine, add the specified engine coolant until the level is between the upper and lower lines on the engine coolant reservoir tank.



CAUTION
Repeat the above procedure several times and make sure the radiator is filled with engine coolant to the upper line of the engine coolant reservoir tank.

Engine coolant capacity (including reservoir): 1950 ml

Radiator

Inspect every 1000 km (50 hours, 3 months).

- Inspect the radiator for damage and engine coolant leakage. If any damages are found, replace it with a new one.

Radiator Hoses

Inspect every 2000 km (100 hours, 6 months).

- Inspect the radiator hoses for damage and engine coolant leakage. If any damages are found, replace them with new ones.

CVT Water Draining Inspection

- If the inside of the CVT had been accumulates with water, draining the water to keep CVT from damage or danger is necessary.
- Remove the CVT drainage bolt to drain the water that from the CVT.

Drive Belt

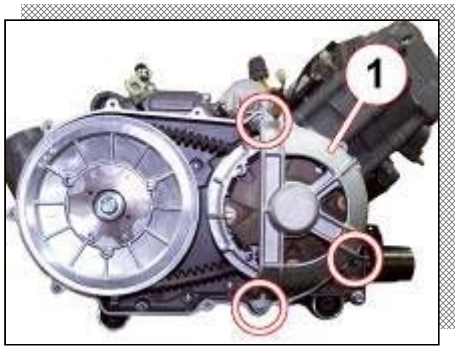
Inspect every 1000 km (50 hours, 3 months).
Replace every 2000 km (100 hours, 6 months).

Removal

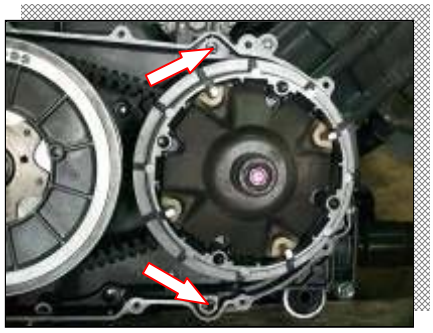
- Remove the right body decoration. (See Body chapter)
- Remove the right footboard.
- Remove the footrest [1].

- Remove the CVT cover [1] and gasket.

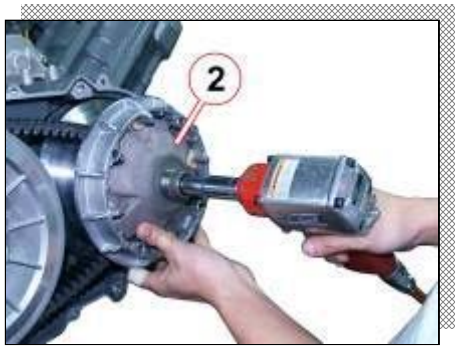
● Remove the movable drive face cover [1].



● Remove the dowel pins.

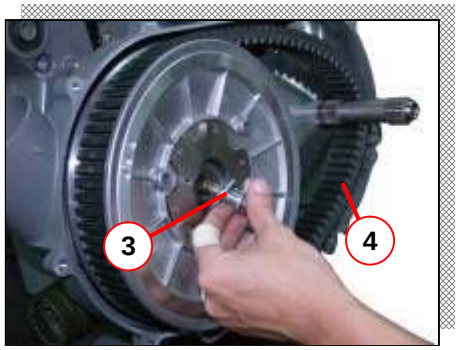


● Remove the movable drive face by removing its bolt [2].



● Remove the movable driven face with belt by removing movable driven face bolt [3].

● Remove the drive belt [4] from the movable driven face.



Inspection

● Inspect the drive belt for wear or damage. If any cracks or damages are found, replace it with a new one.

Installation

● Install the drive belt in the reverse order of removal. Pay attention to the following points.

○ Install the drive belt, as low as possible, between the movable driven face and fixed driven face by using the special tool.

CAUTION
○ The drive belt contact surface of the driven face should be thoroughly cleaned.

Movable Driven Face Spring Compressor

○ The other way is using the same size bolts, which at least 70 mm long to install the drive belt.

● Install the movable driven face assembly.

CAUTION
Pull the center area of upper and lower belt lines to be close to each other to prevent the belt from expanding.

● Tighten the movable driven face bolt to the specified torque with the special tool.

Tightening Torque: 110 N-m (11.0 kgf-m, 79.5 lb-ft)

● Install the movable drive face assembly.

NOTE
Degrease the movable drive face assembly. Use nonflammable cleaning solvent to wipe off oily and greasy matter and make its surfaces completely dry.

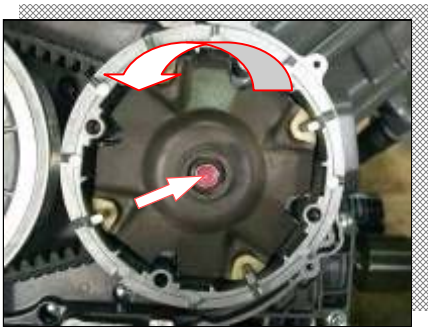
● Install the collar and movable drive face bolt.

NOTE
Be careful about the direction of the collar.

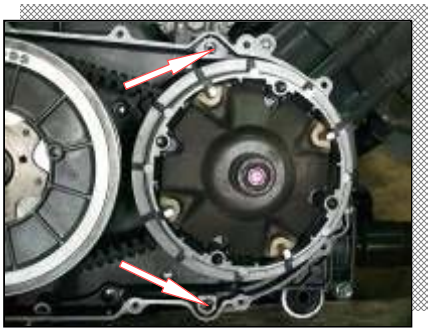
● Tighten the movable drive face bolt to the specified torque with the special tool.

Tightening Torque: 85 N-m (8.5 kgf-m, 62.0 lb-ft)

NOTE
Turn the fixed drive face until the belt is seated in and both the drive and driven faces will move together smoothly without slip.



● Install the dowel pins.



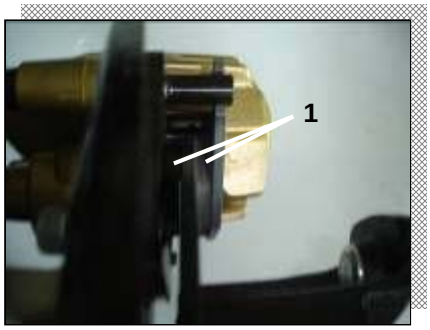
● Install the movable drive face cover [1].

Brakes

Inspect initially at 200 km (10 hours, 1 month) and every 200 km (10 hours, 1 month) thereafter.

Front Brake Pad

- Remove the front wheels.
- The extent of front brake pad wear can be checked by observing the limit line [1] on the side of brake pads. When the wear reaches the limit line, replace the pads with new ones.



CAUTION
Replace the brake pads as a set, otherwise braking performance will be adversely affected.

Tightening Torque: 18 N-m (1.8 kgf-m, 13.0 lb-ft)

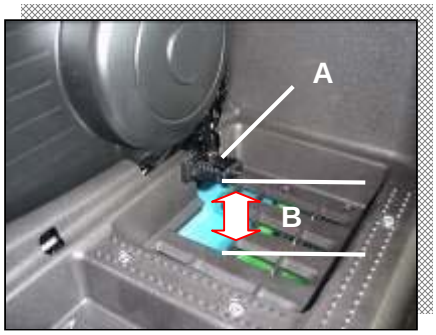
Rear Brake Pad

- Remove the rear wheels.
- The extent of rear brake pad wear can be checked by observing the limit line [1] on the side of brake pads. When the wear reaches the limit line, replace the pads with new ones.

CAUTION
Replace the brake pads as a set, otherwise braking performance will be adversely affected.

Foot Brake Pedal

- Check that the brake pedal [A] is in the correct position as shown.

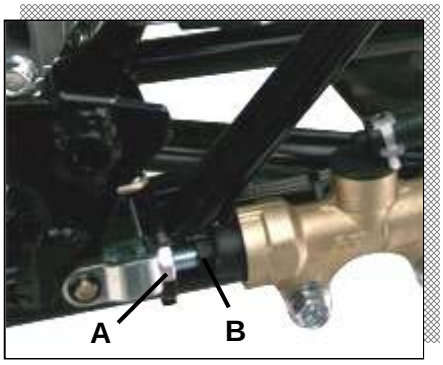


Pedal Position [B]	
Standard	72 ~ 80 mm above footrest

★ If it is incorrect, adjust the brake pedal position.

NOTE
First adjust the brake pedal, and then adjust the brake lever.

- Loosen the nut [A], and turn the bracket [B] until pedal is correctly positioned.
- Tighten the nut [A].
- Make sure to tighten the nut [A] securely.

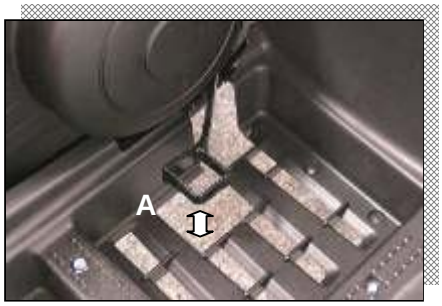


● Check the brake pedal free play [A].

○ Depress the brake pedal lightly by hand until the brake is applied.

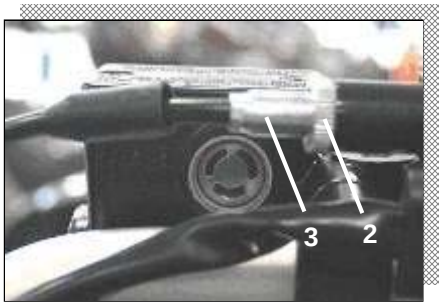
★ If the free play is incorrect, adjust it.

Pedal Free Play	
Standard	2 .2 ± 0.5 mm



Brake Lever

● After adjusting the brake pedal, check the brake lever play [1]. The brake lever play [1] as measured at the lever holder should be between 6- 8 mm when the lever is lightly pulled in towards the grip. If adjustment is necessary, slacken the cable by loosening the locknut [2] and screwing the adjusters [3] on the brake lever holder all the way in.



Brake Lever Play [1]	
Standard	6 - 8 mm

● after adjusting the play, check that the wheels roll freely without applying the brake, the transmission in neutral and the wheels off the ground. Readjust the brake lever if the wheel could not roll freely.

Brake Fluid

Inspect every 1000 km (50 hours, 3 months) Replace every two years.

- Place the handlebar straight.
- Check the brake fluid level by observing the lower limit line on the brake fluid reservoir.
- When the brake fluid level is below the lower limit line, replenish with brake fluid that meets the following specification.

Specification and Classification: DOT4

⚠ WARNING
○ The brake system of this vehicle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based and petroleum-based fluids. Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for a long period of time. ○ Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces. Check the brake hoses and hose joints for cracks and oil leakage before riding.

Air Bleeding the Brake Fluid Circuit

- Air trapped in the brake fluid circuit acts like a cushion absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by “sponginess” of the brake lever and also by lack of braking force.
- Considering the danger to which such trapped air exposes the machine and rider, it is essential that, after installing the brake and restoring the brake system to the normal condition, the brake fluid circuit be purged of air in the following manner.

○ Remove the reservoir cap and fill the reservoir with new brake fluid.

○ Slowly pump the brake lever several times until no air bubbles can be seen rising up through the fluid from the hose at the bottom of the reservoir. This bleeds the air from the master cylinder and the brake line.

NOTE
○Tap the brake hose lightly going from the caliper to the reservoir side and bleed the air off at the reservoir.

○ Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.

○ Bleed the brake line and the caliper as follows:

○ Hold the brake level applied [B].

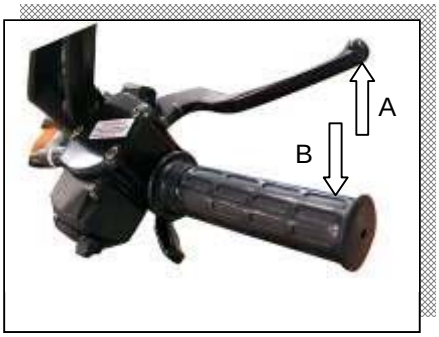
○ Quickly open and close the bleed valve.

○ Release the brake lever [A].

● Repeat this operation until no bubbles comes out the brake fluid reservoir.

● The fluid level must be checked several times during the bleeding operation and replenished as necessary.

NOTE
While bleeding the brake system, replenish the brake fluid in the reservoir as necessary. Make sure that there is always some fluid visible in the reservoir.



● Tighten the bleed valve to the specified torque.

Tightening Torque: 5.5 N-m (0.55 kg-m, 48 in-lb)

● Apply the brake lever forcefully for a few seconds, and check for fluid leakage around the fittings.

CAUTION
Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials, etc.

Brake Hoses

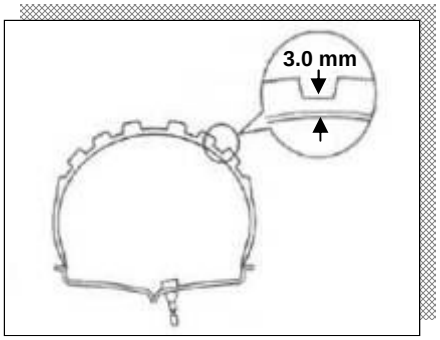
Inspect every 1000 km (50 hours, 3 months)

● Check the brake hoses for leakage, cracks, wear and damage. If any damages are found, replace the brake hoses with new ones.

Tires

Inspect every 1000 km (50 hours, 3 months)

Tire Tread Condition



● Operating the vehicle with excessively worn tires will decrease riding stability and consequently invite a dangerous situation. It is highly recommended to replace a tire when the remaining depth of the tire tread reaches the following specification.

Tire Depth Gauge

Tire Tread Depth	
Service Limit (Front)	3.0 mm
Service Limit (Rear)	3.0 mm

Tire Pressure

● If the tire pressure is too high or too low, steering will be adversely affected and tire wear will increase. Therefore, maintain the correct tire pressure for good roadability and a longer tire life.

Inflation Tire Pressure	kPa	Kgf/cm²	psi
Front	35	0.35	5.0
Rear	35	0.35	5.0

Vehicle Load Capacity Limit: 250 kg (551 lb)

CAUTION
To minimize the possibility of tire damage from over-inflation, we strongly recommended that a manual type air pump be used rather than a high pressure air compressor as found in service stations. When filling air into the tires, never exceed 70kPa (0.7 kgf-cm², 10 psi).

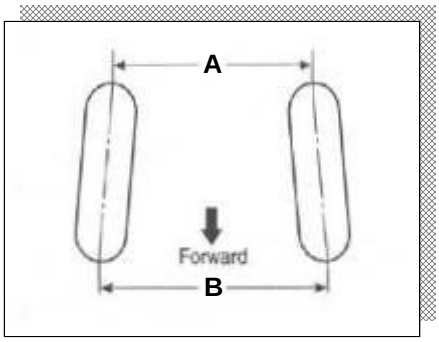
CAUTION
The standard tire fitted on this vehicle is an AT25×8-12 for the front and a AT25×10-12 for the rear. The use of tires other than those specified may cause instability. It is highly recommended to use the specified tires

Steering

Inspect initially at 200 km (10 hours, 1 month) and every 200 km (10 hours, 1 month) thereafter.

- Steering system should be adjusted properly for smooth manipulation of the handlebars and safe running.

Toe-Out



- Place the vehicle on level ground.
- Make sure the tire pressure for right and left tires is the same and set to the proper specification.
- Set the front wheels in the straight position.
- Place a load of 75 kg (165 lbs) on the seat.
- Measure the distances ([A] and [B]) between the front wheels. Subtract the measurement of [B] from that of [A] to find the toe-out. If the toe-out is not within specification, adjust the tie-rod to the right or left until the toe-out is within the specified range.

[B] – [A] = Toe-out

Toe-Out	
Standard	10 ± 4 mm

- If the toe-out is out of specification, bring it into the specified range.

Suspensions

Inspect every 2000 km (100 hours, 6 months).

- Support the vehicle with a jack and wooden blocks.
- Remove the front and rear wheels.
- Inspect the A-arm and bushing for scratches, wear, or damage. If any damages are found, replace them with new ones. (See Suspension chapter)
- Inspect the front and rear shock absorbers for oil leakage or damage. If any damages are found, replace them with new ones. (See Suspension chapter)

Shift Rod

- Check the position of the gearshift lever, shift the lever to the "N" position and check if the lever moves smoothly as shown in the figure.
- If the lever can not move successfully, measure the tie rod length and adjust the tie rod to the proper position.

- Adjust the tie rod in two positions as shown in the figure.

NOTE
Be careful not to separate the rod from the joint by turning the rod too much.

CAUTION
○ Adjust the tie rod length immediately if it does not conform to the standard, or it will cause the transmission gears to wear or damage.

Reverse Shifting Switch Device

- If the foot brake did not applied before shifting to the “R” or “P” position, shifting to the “R” or “P” position is not available.
- Apply the foot brake.

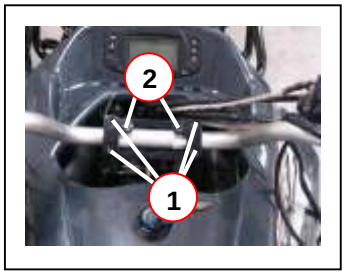
- The cable will pull the stopper to allow the transmissions gear shifting to the “R” or “P” position due to foot brake applied.

Chassis Nuts and Bolts

Tighten initially at 200 km (10 hours, 1 month) and every 200 km (10 hours, 1month) thereafter.

- Check that all chassis nuts and bolts are tightened to their specified torque. (Refer to page 9 - 30) for the locations of the following nuts and bolts.)

Item	N-m	kgf-m	lb-ft
1. Handlebar upper clamp bolt	26	2.6	19.0
2. Handlebar holder nut	10	1.0	7.0
3. Steering shaft bracket bolt	23	2.3	16.5
4. Steering shaft lower nut	120	12.0	87.0
5. Front A-arm upper bolt/nut	60	6.0	43.5
6. Front A-arm lower bolt/nut	60	6.0	43.5
7. Hub nut (front and rear)	110	11.0	79.5
8. Wheel set nut	60	6.0	43.5
9. Steering knuckle end nut (upper and lower)	29	2.9	21.0
10. Front shock absorber mounting bolt/nut (lower)	60	6.0	43.5
11. Front shock absorber mounting bolt/nut (upper)	60	6.0	43.5
12. Tie rod end nut	29	2.9	21.0
13. Tie rod locknut	27	2.7	20.0
14. Front brake air bleeder valve	5.5	0.55	4.0
15. Front brake caliper mounting bolt	25	2.5	18.0
16. Footrest mounting bolt	55	5.5	40.0
17. Front brake hose banjo bolt	25	2.5	18.0
18. Rear shock absorber mounting bolt/nut (lower)	60	6.0	43.5
19. Rear shock absorber mounting bolt/nut (upper)	60	6.0	43.5
20. Rear A-arm bolt/nut (upper and lower)	60	6.0	43.5
21. Rear knuckle nut (upper and lower)	60	6.0	43.5
22. Rear stabilizer link nut	34	3.4	24.5
23. Hitch ball mounting bolt	60	6.0	43.5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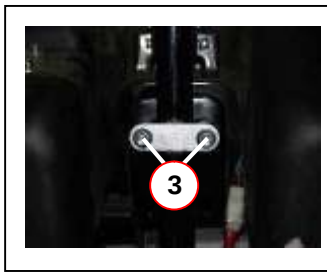
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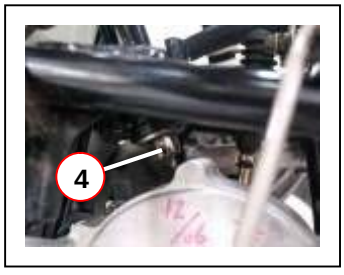
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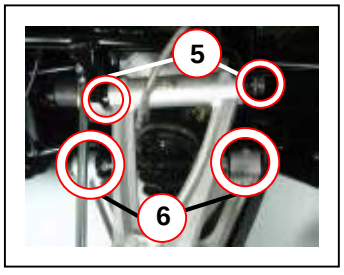
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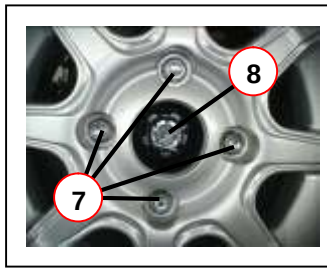
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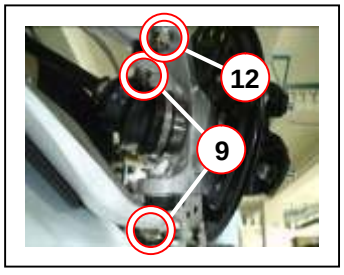
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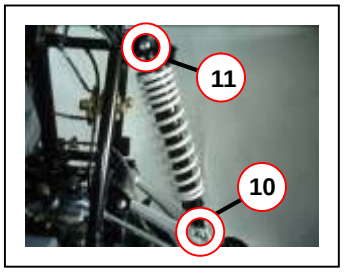
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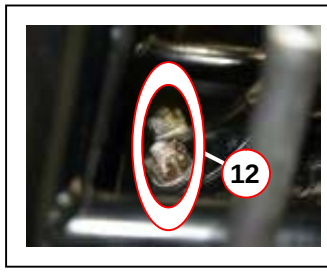
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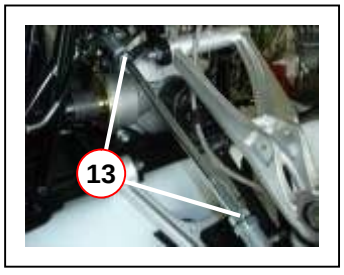
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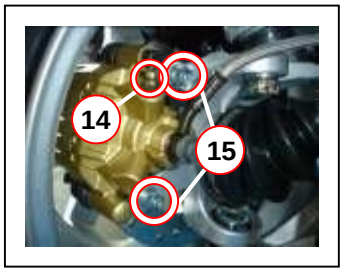
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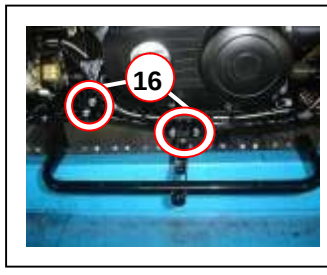
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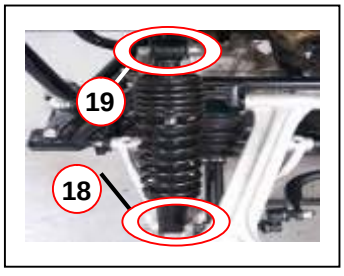
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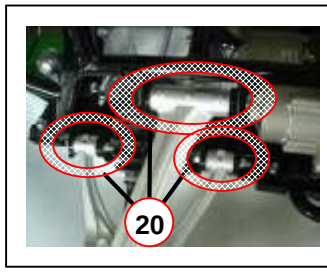
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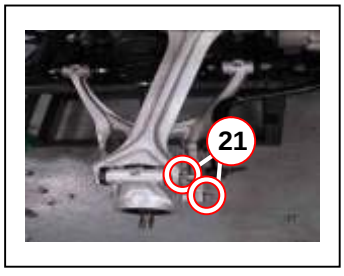
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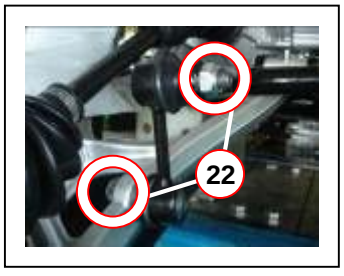
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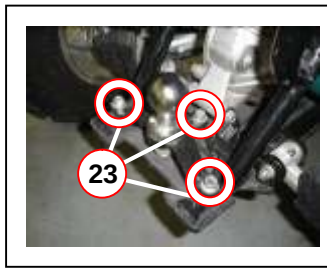
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General Lubrication

Lubricate every 1000 km (50 hours, 3months)

- Proper lubrication is important for smooth operation and long life of each working part of the vehicle.
- Major lubrication points are indicates below.

1	Steering shaft holder	5	Drive shaft joint spline
2	Brake lever holder and throttle lever	6	Front A-arm grease valve
3	Brake pedal	7	Rear A-arm grease valve
4	Propeller shaft joint spline	8	Drive belt cover bearing (inner race)

NOTE

- Before lubricating each part, remove any rust and wipe off any grease, oil, dirt, or grime.
- Lubricate exposed parts which are subject to rust, with a rust preventative spray, especially whenever the vehicle has been operated under wet or rainy conditions.

Compression Pressure Check

● The compression pressure reading of a cylinder is a good indicator of its internal condition.

● The decision to overhaul the cylinder is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression readings for each maintenance service.

Compression Pressure	
Standard	950 kPa (9.5 kgf-cm², 135 psi)
(Automatic decompression actuated)	

Low compression pressure can indicate any of the following conditions.

○ Excessively worn cylinder walls.

○ Worn piston or piston rings.

○ Piston ring stuck in grooves.

○ Poor valve seating.

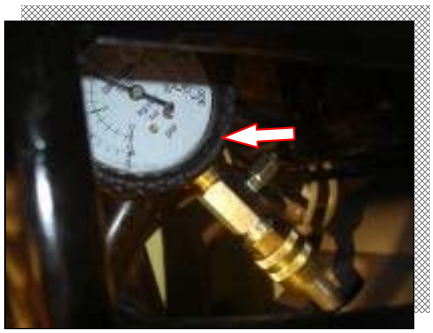
○ Ruptured or otherwise defective cylinder head gasket.

NOTE
When the compression pressure goes below specification, check the engine for conditions listed above.

Compression Test Procedure

NOTE
○ Before testing the engine for compression pressure, make sure that the cylinder head nuts are tightened to the specified torque and the valves are properly adjusted. ○ Warm up the engine before testing. ○ Make sure that the battery is fully charged.

● Remove the related parts and test the compression pressure in the following manner.



○ Remove the spark plug.

○ Install the compression gauge in the spark plug hole. Make sure that the connection is tight.

○ Keep the throttle lever in the fully open position.

○ Press the starter button and crank the engine for a few seconds. Record the maximum gauge reading as the cylinder compression.

D002-Compression Gauge Set

Oil Pressure Check

● Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

Oil Pressure	
Standard	Above 15 kPa (0.15 kgf/cm², 2.0 psi)

● Low or high oil pressure can indicate any of the following conditions

Low Oil Pressure

○ Clogged oil filter.

○ Oil leakage from the oil passage.

○ Damaged O-ring.

○ Defective oil pump.

○ Combination of the above items.

High Oil Pressure

○ Engine oil viscosity is too high.

○ Clogged oil Passage.

○ Combination of the above items.

Oil Pressure Test Procedure

● Remove the front fender. (See Body chapter)

● Remove the fuel tank. (See Body chapter)

● Connect the tachometer onto the spark plug high voltage cable.

● Remove the cooling duct.

● Remove the oil pressure switch.

● Install the oil pressure gauge into the cylinder head gallery.

● Start the engine.

● After warming up the engine, maintain the engine at idle speed 1300 rpm and read the oil pressure gauge.

Oil Pressure Gauge

Initial Engagement and Clutch Lock-Up

Inspection

● To insure proper performance and longevity of the clutch assemblies it is essential that the clutches engage smoothly and gradually. Before checking the initial engagement and clutch lock-up two inspection checks must be performed to thoroughly check the operation of drive train. Perform the following.

○ Warm up the engine.

Initial Engagement Inspection

● Connect the tachometer or the multi-circuit tester onto the spark plug high voltage cable.

● Start the engine.

● Shift the range lever to the "HIGH" position.

● Slowly open the throttle and note the engine speed (rpm) when the vehicle begins to move forward.

Tachometer or

Multi-Circuit Tester

Engagement Speed: 1800 – 2000 rpm

● If the engagement speed does not coincide with the standard range, inspect the following items for any abnormalities.

○ Clutch shoe. (See Engine chapter)

○ Clutch wheel. (See Engine chapter)

○ Movable drive and driven face. (See Engine chapter)

Clutch Lock-Up Inspection

- Perform this inspection to determine if the clutch is engaging fully and not slipping.
- Connect a tachometer onto the spark plug high voltage cable.
- Start the engine.
- Shift the range lever to the "HIGH" position.
- Apply the front and rear brakes as firmly as possible.
- Fully open the throttle for a brief period and note the maximum engine speed sustained during the test cycle.

Lock-Up Speed: 3800 – 4200 rpm

CAUTION
Do not apply full power for more than 5 seconds or damage to the clutch or engine may occur.

- If the lock-up speed (rpm) does not coincide with the standard range, inspect the following items for any abnormalities.

○ Clutch shoe. (See Engine chapter)

○ Clutch wheel. (See Engine chapter)

○ Movable drive and driven face. (See Engine chapter)

APPENDIX

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Troubleshooting Guide

CAUTION
This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.

Engine

Engine Doesn't Start, Starting Difficulty

1. Starter motor not rotating

- Starter motor trouble.
- Battery voltage low.
- Relays not contacting or operating.
- Starter button not contacting.
- Wiring open or shorted.
- Ignition switch trouble.
- Fuse blown.

2. Starter motor rotating but engine doesn't turn over

- Starter one way clutch trouble.

3. Recoil starter not operating

- Recoil starter spring broken.
- Recoil starter pawl not engaging.

4. Engine won't turn over

- Valve seizure.
- Rocker arm seizure.
- Cylinder, piston seizure.
- Crankshaft seizure.
- Connecting rod small end seizure.
- Connecting rod big end seizure.
- Transmission gear or bearing seizure.
- Camshaft seizure.
- Balancer bearing seizure.

5. No fuel flow

- Fuel tank air vent obstructed.
- Return fuel pump clogged.
- Fuel line clogged.
- Float valve clogged.
- Fuel filter clogged.

6. Engine fuel flooded

- Fuel level too high.
- Float valve worn or stuck open.
- Starting technique faulty.

(When flooded, crank the engine with the throttle fully opened to allow more air to reach the engine.)

7. Fuel/air mixture incorrect

- Pilot screw and/or idle adjusting screw maladjusted.
- Pilot jet, or air passage clogged.
- Air cleaner clogged, poorly sealed, or missing.
- Fuel jet clogged.

8. No spark; spark weak

- Spark plug dirty, broken, or maladjusted.
- Spark plug cap or spark plug cable trouble.
- Spark plug cap not in good contact.
- Spark plug incorrect.
- Pickup coil trouble.
- CDI unit trouble.
- Ignition coil trouble.
- Battery voltage low.
- Wiring shorted or open.
- Fuse blown.

9. Compression Low

- Spark plug loose.
- Cylinder head not sufficiently tightened down.
- No valve clearance.
- Cylinder, piston worn.
- Piston ring bad (worn, weak, broken, or sticking).
- Piston ring/groove clearance excessive.
- Cylinder head gasket damaged.
- Cylinder head distorted.
- Valve spring broken or weak.
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface).
- Mistimed valves.
- Starter motor cranks too slowly.

Poor Running at Low Speed

1. Spark weak

- Spark plug dirty, broken, or maladjusted.
- Spark plug cap or Spark plug cable trouble.
- Spark plug cap shorted or not in good contact.
- Spark plug incorrect.
- CDI unit trouble.
- Pickup coil trouble.
- Ignition coil trouble.

2. Fuel/air mixture incorrect

- Pilot screw and/or idle adjusting screw maladjusted.
- Pilot jet, or air passage clogged.
- Air cleaner clogged, poorly sealed, or missing.
- Fuel level too high or too low.
- Fuel tank air vent obstructed.
- Carburetor holder loose.
- Air cleaner duct loose.

3. Compression low

- Spark plug loose.
- Cylinder head not sufficiently tightened down.
- Loss of valve clearance.
- Cylinder, piston worn.
- Piston ring bad (worn, weak, broken, or sticking).
- Piston ring/groove clearance excessive.
- Cylinder head gasket damaged.
- Cylinder head distorted.
- Valve spring broken or weak.
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface).

4. Other

- Carburetor vacuum piston doesn't slide smoothly.
- Engine oil viscosity too high.
- CDI unit trouble.

Poor Running or No Power at High Speed

1. Firing incorrect

- Spark plug dirty, broken, or maladjusted
- Spark plug cap or Spark plugs cable trouble.
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- Pickup coil trouble
- CDI unit trouble
- Ignition coil trouble

2. Fuel/air mixture incorrect

- Main jet clogged or wrong size.
- Jet needle or needle jet worn.
- Bleed holes of air bleed pipe or needle jet clogged.
- Fuel level too high or too low.
- Air cleaner clogged, poorly sealed, or missing.
- Water or foreign matter in fuel.
- Carburetor holder loose.
- Air cleaner duct loose.
- Fuel tank air vent obstructed.
- Return fuel pump clogged.
- Fuel line clogged.

3. Compression low

- Spark plug loose.
- Cylinder head not sufficiently tightened down.
- Loss of valve clearance.
- Cylinder, piston worn.
- Piston rings bad (worn, weak, broken, or sticking).
- Piston ring/groove clearance excessive.
- Cylinder head gasket damaged.
- Cylinder head distorted.
- Valve spring broken or weak.
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface.).

4. Knocking

- Carbon built up in combustion chamber.
- Fuel poor quality or incorrect.
- Spark plug incorrect.
- CDI unit trouble.
- Engine overheating.

5. Miscellaneous

- Throttle valve won't fully open.
- Carburetor vacuum piston doesn't slide smoothly.
- Overheating.
- Engine oil level too high.
- Engine oil viscosity too high.
- Balancer mechanism malfunctioning.

Overheating

1. Firing incorrect

- Spark plug dirty, broken, or maladjusted.
- Spark plug incorrect.
- CDI unit trouble.

2. Compression high

- Carbon built up in combustion chamber.

3. Engine load faulty

- Engine oil level too high.
- Engine oil viscosity too high.
- Drive train trouble.

4. Lubrication inadequate

- Engine oil level too low.
- Defective oil pump or clogged oil circuit.
- Engine oil poor quality or incorrect.

Exhaust Smokes Excessively

1. White smoke

- Piston oil ring worn.
- Cylinder worn.
- Valve oil seal damaged.
- Valve guide worn.
- Cylinder head gasket damaged.
- Engine oil level to high.

2. Black Smoke

- Air cleaner clogged.
- Main jet too large or fallen off.
- Spark too weak.
- Incorrect fuel/air mixture.
- Fuel level too high.

Abnormal Engine Noise

1. Knocking

- CDI unit trouble.
- Carbon built up in combustion chamber.
- Fuel poor quality or incorrect.
- Spark plug incorrect.
- Overheating.

2. Piston noise

- Cylinder/piston clearance excessive.
- Cylinder, piston holes worn.
- Connecting rod bent.
- Piston pin, piston holes worn.
- Worn piston rings or ring grooves.
- Combustion chamber fouled with carbon.

3. Valve noise

- Valve clearance incorrect.
- Valve spring broken or weak.
- Camshaft bearing worn.
- Rocker arm worn.
- Worn tappet or cam surface.

4. Water pump noise

- Too much play on pump shaft bearing.
- Worn or damaged impeller shaft.
- Worn or damaged mechanical seal.
- Contact between pump case and impeller.

5. Other noise

- Connecting rod small end clearance excessive.
- Connecting rod big end clearance excessive.
- Piston ring worn, broken, or stuck.
- Piston seizure, damage.
- Cylinder head gasket leaking.
- Exhaust pipe leaking at cylinder head connection.
- Crankshaft runout excessive.
- Engine mounts loose.
- Crankshaft bearing worn.
- Camshaft chain tensioner trouble.
- Camshaft chain, sprocket, guides worn.
- Balancer bearing worn.
- Balancer gear worn.
- Loose alternator rotor.
- Worn or rubbing gears.
- Worn splines.

Radiator (Cooling System)

Engine Overheats

- Not enough engine coolant.
- Radiator core clogged with dirt.
- Faulty cooling fan.
- Defective cooling fan thermo-switch.
- Clogged water passage.
- Air trapped in the cooling circuit.
- Defective water pump.
- Use of incorrect engine coolant.
- Defective thermostat.

Engine Overcools

- Defective cooling fan thermo-switch.
- Extremely cold weather.
- Defective thermostat.

Transmission

Gear Shifting Faulty

1. Doesn't go into gear

- Shift arm bent or seized.
- Gear stuck on the shaft.
- Shift tie-rod maladjusted.
- Shift tie-rod damaged.

2. Jumps out of gear

- Shifter groove worn.
- Shift cam worn.
- Shift stopper positioning bolt spring weak or broken.
- Shift tie-rod maladjusted.
- Drive shaft, output shaft, and/or gear worn.
- Distorted or worn gearshift forks.

3. Over shifts

- Shift arm positioning bole spring weak or broken.
- Shift tie-rod maladjusted.

Transmission noise

- Bearing worn.
- Transmission gears worn or chipped.
- Metal chips jammed in gear teeth.
- Engine oil insufficient or too thin.

Drive Train

CVT Operation Faulty

1. Belt slipping

- Belt dirty, worn, or wetted.
- Drive or driven pulley sheave dirty or worn.
- Drive pulley spring broken or weak.

2. CVT engagement speed too low

- Drive pulley spring broken or weak.

3. CVT engagement speed too high

- Belt dirty or worn.
- Drive or driven pulley sheave dirty or worn.
- Drive pulley doesn't move smoothly.
- Drive pulley movable sheave doesn't move smoothly.
- Drive or driven pulley movable sheave bush worn.
- Drive pulley roller worn.

4. Shifting too quickly

- Drive pulley spring weak.
- Driven pulley spring weak or incorrectly installed (too loose).

5. Shifting too slowly

- Belt dirty or worn.
- Drive or driven pulley sheave dirty or worn.
- Drive pulley doesn't move smoothly.
- Drive pulley movable sheave doesn't move smoothly.
- Driven pulley spring incorrectly installed (too tight).
- Drive pulley movable sheave doesn't move smoothly.

Abnormal Drive Train Noise

1. CVT noise

- Belt worn.
- Drive or driven pulley sheave worn.
- Drive or driven pulley movable sheave bush worn.
- Drive or driven pulley loose.
- Drive pulley slide piece worn.
- Drive pulley roller worn.

2. Front or rear final gear case noise

● Insufficient lubricant.

● Incorrect oil (Front final gear case).

● Bevel gear bearings worn.

● Bevel gears worn or chipped.

● Bevel gears maladjusted.

3. Front axle or propeller shaft noise

● Front propeller shaft (Constant velocity universal joint) damaged.

Front or rear final gear case overheating

● Insufficient oil.

● Bevel gears maladjusted.

Chassis

Break Doesn't Hold or insufficient brake power

1. Front brake

- Air in the brake line.
- Brake fluid leakage.
- Brake fluid deteriorated.
- Primary or secondary cup trouble.
- Master cylinder scratched inside.
- Pad over worn or worn unevenly.
- Oil, grease on pads and disc.
- Disc worn or scored.
- Brake system overheated.
- Pressure valve trouble.
- Brake pedal not properly adjusted.

2. Rear Brake

- Air in the brake line.
- Brake fluid leakage.
- Brake fluid deteriorated.
- Primary or secondary cup trouble.
- Master cylinder scratched inside.
- Brake pedal not properly adjusted.
- Pad over worn or worn unevenly.
- Disc worn unevenly or scored.
- Oil, grease on pads and disc.
- Dirt, water between pads and disc.
- Brake system overheated.
- Pressure valve trouble.

Excessive Brake Lever Stroke

- Air in hydraulic system.
- Insufficient brake fluid.
- Improper quality of brake fluid.

Noisy Brake

- Foreign material adhesion on pad surface.
- Tilted pad.
- Damaged wheel hub bearings.
- Foreign material in brake fluid.
- Pad installed incorrectly.
- Pad surface glazed.
- Disc or pads worn or warped.
- Clogged return port of master cylinder.
- Caliper trouble.

Leakage of Brake Fluid

- Insufficient tightening of connection joints.
- Cracked hose.
- Worn piston and/or cup.

Brake Drags

- Rusty part.
- Insufficient brake lever or brake pedal pivot lubrication.

Shock absorption unsatisfactory

1. Too hard

- Tire air pressure too high.
- Shock absorber maladjusted.
- Worn upper or lower A-arm and related bushing.

2. Too soft

- Shock absorber oil leaking.
- Shock absorber spring weak.
- Tire air pressure too low.
- Shock absorber maladjusted.

Noisy Suspension

- Loose nuts or bolts on suspension.
- Worn A-arms and related bushings.

Handing and/or stability Unsatisfactory

1. Handlebar hard to turn

- Tire air pressure too low.
- Steering shaft bearing damaged.
- Steering shaft bearing lubrication inadequate.
- Steering shaft bent.
- Damaged steering knuckle joint.
- Damage tie-rod end.
- Improper front wheel alignment.

2. Handlebar shakes or excessively vibrates

- Defective or incorrect tires.
- Unequally inflated tires.
- Loose front wheel hub nuts.
- Worn or loose tie-rod ends.
- Damaged or worn A-arms and related bushings.
- Wheel rim warped.
- Front axle runout excessive.
- Wheel bearing worn.
- Handlebar clamp loose.
- Loose chassis nuts and bolts.

3. Handlebar pulls to one side

- Frame bent.
- Improper front wheel alignment.
- Worn front wheel hub bearings.
- Suspension arm bent or twisted.
- Steering shaft bent.
- Front or rear tire air pressure unbalanced.
- Front shock absorber unbalanced.

Shocks Felt In The Steering

- High tire pressure.
- Worn steering linkage connection.
- Loose suspension system bolts.

Tires Rapidly or Unevenly Wear

- Worn or loose front wheel hub bearings.
- Improper front wheel alignment.

Wobbly Rear Wheel

- Distorted wheel rims.
- Damage or worn rear wheel hub bearings.
- Defective or incorrect tires.
- Loose nuts or bolts on rear suspensions.
- Loose rear wheel hub nuts.
- Improper rear brake adjustment.
- Rear shock absorber leaks oil.
- Loosen rear stabilizer mounting bolts.

Other Noise

- Shock absorber damaged.
- Bracket, nut bolt, etc. not properly mounted or tightened.
- Damaged or worn front wheel hub bearings.
- Insufficiently lubricated.

Electrical

Spark Plug Soon Become Fouled With Carbon

- Mixture too rich.
- Idling speed set too high.
- Incorrect gasoline.
- Dirty air cleaner.

Spark Plug Become Fouled Too Soon

- Worn piston rings.
- Worn piston or cylinder.
- Excessive clearance of valve stems in valve guides.
- Worn stem oil seal.

Spark Plug Electrodes Overheat or Burn

- Too hot spark plug.
- Overheated the engine.
- Loose spark plug.
- Too lean mixture.

Start Button Is Not Effective

- Run down battery.
- Defective switch contacts.
- Brushes not seating properly on starter motor commutator.
- Defective starter relay/starter interlock switch.
- Defective main fuse.

2WD/4WD Button Does Not Work

- Wiring connections loose or disconnected.
- Defective actuator assembly.

Diff-Lock Button Does Not Work

- Defective diff-lock switch.
- Wiring connections loose or disconnected.
- Defective actuator assembly.

Battery

Battery Discharged

- Battery faulty (e.g., plates sulfated, shorted through Sedimentation, electrolyte level too low).
- Battery lead wires making poor contact.
- Load excessive (e.g., bulb of excessive wattage).
- Ignition switch trouble.
- Regulator/ rectifier trouble (e.g., shorted-circuited or punctured regulator/rectifier).
- Alternator trouble (e.g., short-circuited, grounded or open alternator coil).
- Wiring faulty.

Battery Over charged

- Regulator/rectifier trouble.
- Poorly grounded regulator/rectifier.
- Battery trouble (e.g., internal short-circuit in the battery).

Alternator Dose Charge, But Charging Rate Is Below The Specification

- Lead wires tend to get short- or open-circuited or loosely connected at terminals.
- Grounded or open-circuited alternator coil.
- Defective regulator/rectifier.
- Defective cell plates in the battery.

Unstable Charging

- Lead wire insulation frayed due to vibration, resulting in intermittent short-circuiting.
- Internally short-circuited alternator.
- Defective regulator/rectifier.

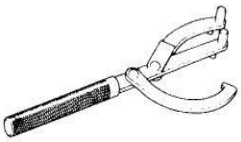
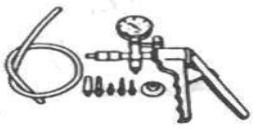
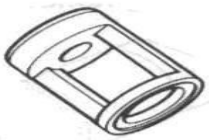
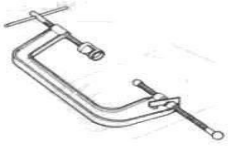
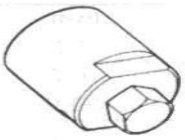
Battery Runs Down Quickly

- Trouble in charging system.
- Cell plates have lost much of their active material as a result of overcharging.
- Internal short-circuit in the battery.
- Too low battery voltage.
- Too old battery.
- The option accessories had been installed, so the load excessive.

Battery "Sulfation"

- Incorrect charging rate. (When not in use battery should be checked at least once a month to avoid sulfation).
- The battery was left unused in a cold climate for too long.

Special Tools

 D001- Rotor Holding Tool	 D002- Compression Gauge Set	 D003- Oil Filter Wrench	 D004- Vacuum Pump Gauge
 D005_01- Valve Lifter Attachment	 D005_02- Valve Lifter	 D006- Rotor Remover	 Vernier Calipers
 Piston Ring Clamp	 Micrometer	 Oil Pressure Gauge	 Bearing Remover Set
 Connecting Rod Stopper	 Thickness Gauge	 Ring Nut Socket Wrench	 Ring Nut Socket Wrench

Tightening Torque

Engine

Item		N-m	kgf-m	lb-ft
Cylinder head cover bolt	Initial	10	1.0	7.0
	Final	14	1.4	10.0
Cam drive idle gear/sprocket shaft		41	4.1	29.5
Cylinder head bolt (M6)		11	1.1	8.0
Cylinder head bolt (M10)	Initial	25	2.5	18.0
	Final	37	3.7	27.0
Cam chain tensioner bolt		10	1.0	7.0
Cam chain tensioner adjuster bolt		7	0.7	5.0
Cam chain guide bolt		23	2.3	16.5
Camshaft journal holder bolt		10	1.0	7.0
Crankcase bolt	M6	10	1.0	7.0
	M8	26	2.6	19.0
Valve timing inspection plug		23	2.3	16.5
Clutch shoe nut		150	15.0	108.5
Movable drive face bolt		85	8.5	62.0
Movable driven face bolt		110	11.0	79.5
Movable driven face ring nut		100	10.0	72.0
Generator rotor nut		160	16.0	115
Starter clutch bolt		26	2.6	19.0
Exhaust pipe nut		23	2.3	16.5
Muffler mounting bolt		23	2.3	16.5
Engine oil drain plug		19	1.9	14.0
Engine mounting bolt		60	6.0	43.5
Front drive (differential) gear case mounting bolt		50	5.0	36.0
Rear gear box mounting nut		50	5.0	36.0
Crank balancer drive gear bolt		50	5.0	36.0
Clutch cover bolt		9	0.9	6.5

Chassis

Item		N-m	kgf-m	lb-ft
Handlebar clamp bolt		26	2.6	19.0
Steering shaft bracket bolt		23	2.3	16.5
Steering shaft lower nut		120	12.0	87.0
Front A-arm mounting nut	Upper	60	6.0	43.5
	Lower	60	6.0	43.5
Steering knuckle end nut (upper and lower)		29	2.9	21.0
Tie rod end nut		29	2.9	21.0
Tie rod locknut		27	2.7	20.0
Front shock absorber mounting bolt (upper)		60	6.0	43.5
Front shock absorber mounting nut (lower)		60	6.0	43.5
Hub nut (front and rear)		110	11.0	79.5
Wheel set nut (front and rear)		60	6.0	43.5
Front brake hose banjo bolt		25	2.5	18.0
Front brake air bleeder valve		5.5	0.55	4.0
Front brake pad mounting bolt		18	1.8	13.0
Front brake caliper mounting bolt		25	2.5	18.0
Front brake disc bolt		25	2.5	18.0
Front brake master cylinder mounting bolt		9	0.9	6.5
Footrest mounting bolt		55	5.5	40.0
Rear stabilizer joint nut		34	3.4	24.5
Rear shock absorber mounting nut (upper and lower)		60	6.0	43.5
Rear knuckle nut		60	6.0	43.5
Rear A-arm mounting bolt/nut(upper and lower)		60	6.0	43.5
Hitch ball mounting bolt		60	6.0	43.5
Front drive train gear case mounting bolt		50	5.0	36.0
Front differential gear oil filler plug		35	3.5	25.5
Front differential gear oil drain plug		32	3.2	23.0
Rear gear box mounting bolt/nut		50	5.0	36.0
Rear drive gear oil drain plug		23	2.3	16.5

Cooling System

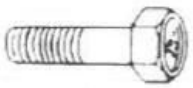
Item	N-m	kgf-m	lb-ft
Water pump cover bolt	10	1.0	7.0
Cooling fan thermo switch	25	2.5	18.0
ECT sensor	20	2.0	14.44
Thermostat cover bolt	10	1.0	7.0
Cooling fan mounting bolt	5	0.5	3.6
Water hose clamp screw	1.5	0.15	1.0

Tightening Torque Chart

● For other nuts and bolts not listed in the preceding page, refer to this chart:

Bolt Diameter [A] (mm)	Conventional or "4" marked bolt			"7" marked bolt		
	N-m	kgf-m	lb-ft	N-m	kgf-m	lb-ft
4	1.5	0.15	1.0	2.3	0.23	1.5
5	3	0.3	2.0	4.5	0.45	3.0
6	5.5	0.55	4.0	10	1.0	7.0
8	13	1.3	9.5	23	2.3	16.5
10	29	2.9	21.0	50	5.0	36.0
12	45	4.5	32.5	85	8.5	61.5
14	65	6.5	47.0	135	13.5	97.5
16	105	10.5	76.0	210	21.0	152.0
18	160	16.0	115.5	240	24.0	173.5

Conventional bolt



"4" marked bolt

"7" marked bolt

Service Data

Valve + Valve Guide

Unit: mm

Item	Standard		Limit
Valve diam	IN.	36.0	—
	EX	33.0	—
Tappet clearance (When cold)	IN.	0.10 – 0.20	—
	EX.	0.20 – 0.30	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037	—
	EX.	0.030 – 0.057	—
Valve guide I.D.	IN. & EX.	5.474 – 5.484	—
Valve stem O.D.	IN.	5.450 – 5.465	—
	EX.	5.430 – 5.445	—
Valve seat width	IN. & EX.	0.9 – 1.1	—
Valve head radial runout	IN. & EX.	—	0.03
Valve spring free length	IN. & EX.	—	48.0
Valve spring tension	IN. & EX.	190 – 214 N (19.0 – 21.4 kgf, 41.8 – 47.2 lbs) at length 36.5 mm	—

Camshaft + Cylinder Head

Unit: mm

Item	Standard		Limit
Cam height	IN.	36.400 – 36.500	36.150
	EX.	35.350 – 35.450	35.100
Camshaft journal oil clearance	IN. & EX.	0.020 – 0.062	0.150
Camshaft journal holder I.D.	IN. & EX.	23.000 – 23.021	—
Camshaft journal O.D.	IN. & EX.	22.959 – 22.980	—
Camshaft runout	—		0.10
Cylinder head distortion	—		0..05

Cylinder + Piston + Piston Ring

Unit: mm

Item	Standard			Limit
Compression pressure (Automatic-decomp. actuated)	Approx. 950 kPa (9.5 kgf/cm², 135 psi)			—
Piston-to-cylinder clearance	0.030 – 0.050			0.120
Cylinder bore	102.000 – 102.020			Nicks or Scratches
Piston diam	101.950 – 101.970 Measure at 15 mm from the skirt end			101.880
Cylinder distortion	—			0.05
Piston ring free end gap	1st	1R	Approx. 12.10	10.1
	2nd	RN	Approx. 11.70	8.7
Piston ring end gap	1st	1R	0.15 – 0.30	0.50
	2nd	RN	0.15 – 0.30	0.50
Piston ring to groove clearance	1st		—	0.180
	2nd		—	0.150
Piston ring groove width	1st		1.21 – 1.23 1.30 – 1.32	—
	2nd		1.21 – 1.23	—
	Oil		2.01 – 2.03	—
Piston ring thickness	1st		1.17 – 1.19	—
	2nd		1.17 – 1.19	—
Piston pin bore I.D.	23.002 – 23.008			23.030
Piston pin O.D.	22.992 – 23.000			22.980

Connecting Rod + Crankshaft

Unit: mm

Item	Standard	Limit
Conrod small end I.D.	23.002 – 23.008	23.035
Conrod deflection	—	0.30
Conrod big end side clearance	0.35 – 0.60	1.0
Conrod big end width	24.95 – 25.00	—
Crank web to web width	72.95 – 73.05	—
Crankshaft runout	—	0.08

Clutch

Unit: mm

Item	Standard	Limit
Clutch wheel I.D.	140.0 – 140.2	140.5
Clutch shoe	—	No groove at any part
Clutch engagement rpm	1800 – 2000 rpm	—
Clutch lock-up rpm	3800 – 4200 rpm	—

Drive Train

Unit: mm

Item		Standard	Limit
Automatic transmission ratio		Variable change (2.670 – 0.787)	—
Secondary reduction ratio		2.158 (40/21 × 17/15)	—
Final reduction ratio	Front	3.600 (36/10)	—
	Rear	3.600 (36/10)	—
Transfer gear ratio	Low	2.294 (39/17)	—
	High	1.133 (30/26)	—
	Reverse	1.882 (32/17)	—
Drive belt width		34.3	33.3
Movable driven face spring free length		158.0	150.0
Shift fork to groove clearance		0.10 – 0.27	0.50
Shift fork groove width	Reverse	5.60 – 5.67	—
	High	5.60 – 5.67	—
Shift fork thickness	Reverse	5.40 – 5.50	—
	High	5.40 – 5.50	—
Front differential gear oil type		Hypoid gear oil SAE #80W–90, API grade GL-5	—
Rear drive gear oil type		Hypoid gear oil SAE #80W–90, API grade GL-5	—
Front differential gear oil capacity		150 ml	—
Rear gear box oil capacity		310 ml	—

Thermostat + Radiator + Fan + Coolant

Unit: mm

Item	Standard/Specification		Note
Thermostat valve opening temperature	80 – 84℃ (176 – 183℉)		
Thermostat valve lift	Over 7.0mm at 95℃		
ECT sensor resistance	60℃ (140℉)	Approx. 0.704 kΩ	
	90℃ (194℉)	Approx. 0.261 kΩ	
	120℃ (248℉)	Approx. 0.111 kΩ	
Radiator cap valve opening pressure	110 – 140 kPa (1.1 – 1.4 kgf/cm², 15.6 – 19.9 psi)		
Cooling fan thermo-switch operating temperature	OFF to ON	Approx. 96℃ (205℉)	
	ON to OFF	Approx. 86℃ (187℉)	
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 1:2 water/anti-freeze ethylene glycol		
Engine coolant	Reservoir	350 ml	
	Engine	1600 ml	

Carburetor

Item	Standard/Specification
Bore Size	42 mm
I.D. No.	Mikuni BSR42
Idle rpm	1300 ± 100 rpm
Throttle cable play	3 – 8 mm

Electrical

Unit: mm

Item		Standard/Specification		Note
Spark plug		Type	NGK: CR6E	
		Gap	0.7 – 0.8	
Spark performance		Over 8 at 1 atm		
Ignition coil resistance		Primary	0.17 – 0.23 Ω	Terminal – Ground
		Secondary	5.0 – 7.6 kΩ	Plug cap - Terminal
CDI output voltage		200 – 250 DCV		
Alternator coil resistance		0.1 – 1.0 Ω		
Alternator no-load voltage (When engine is cold)		65 V (AC) and more at 5000 rpm		
Starter relay resistance		3 – 5 Ω		
Battery	Type designation	GS, GTX20L-BS		
	Capacity	12 V ; 20Ah		
Fuse size	Headlight (HI & LO)	10 A		
	Power source	10 A		
	Ignition	10 A		
	Fan	15 A		
	Main	30 A		

Wattage

Unit: W

Item		Standard/Specification
Headlight	HI	35 × 2
	LO	35 × 2
Taillight		21/5
Speedometer light		LCD
High beam indicator light		LED
Transfer indicator light		LCD
Engine coolant temperature indicator light		LED
Differential lock indicator light		LCD

Brake + Wheel

Unit: mm

Item	Standard/Specification	Limit
Foot brake pedal height	72 - 80	—
Foot brake pedal free play	2 .2 ± 0.5	—
Front brake disc thickness	—	3.0
Rear brake disc thickness	—	3.5
Brake disc runout (Front & Rear)	—	0.30
Brake lever play	6 – 8	—
Brake fluid type	DOT 4	—
Steering angle	30 ° (Right & Left)	—
Turning radius	3.25 m	—
Toe-out (With 75 kg)	10 ± 4	—

Tire

Unit: mm

Item	Standard		Limit
Cold inflation tire pressure (Solo riding)	Front	35 kPa (0.35 kgf/cm², 5.0 psi)	—
	Rear	35 kPa (0.35 kgf/cm², 5.0 psi)	—
Tire size	Front	AT 25 × 8 - 12☆☆, tubeless	—
	Rear	AT 25 × 10 - 12☆☆, tubeless	—
Tire tread depth	Front	—	3.0
	Rear	—	3.0

Suspension

Unit: mm

Item	Specification	Limit
Front shock absorber spring adjustor	5 positions	—
Rear shock absorber spring adjustor	5 positions	—

Fuel + Oil

Item	Specification		Note
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 95 octane or higher rated by the Research Method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5 % methanol with appropriate cosolvents and corrosion inhibitor is permissible.		USA and Canada
	Gasoline used should be graded 95 octane (Research Method) or higher. An unleaded gasoline is recommended.		The others
Fuel tank capacity	20 L		
Engine oil type	SAE 10W-40, API, SF or SG		
Engine oil capacity	Change	3300 ml	
	Overhaul	3500 ml	